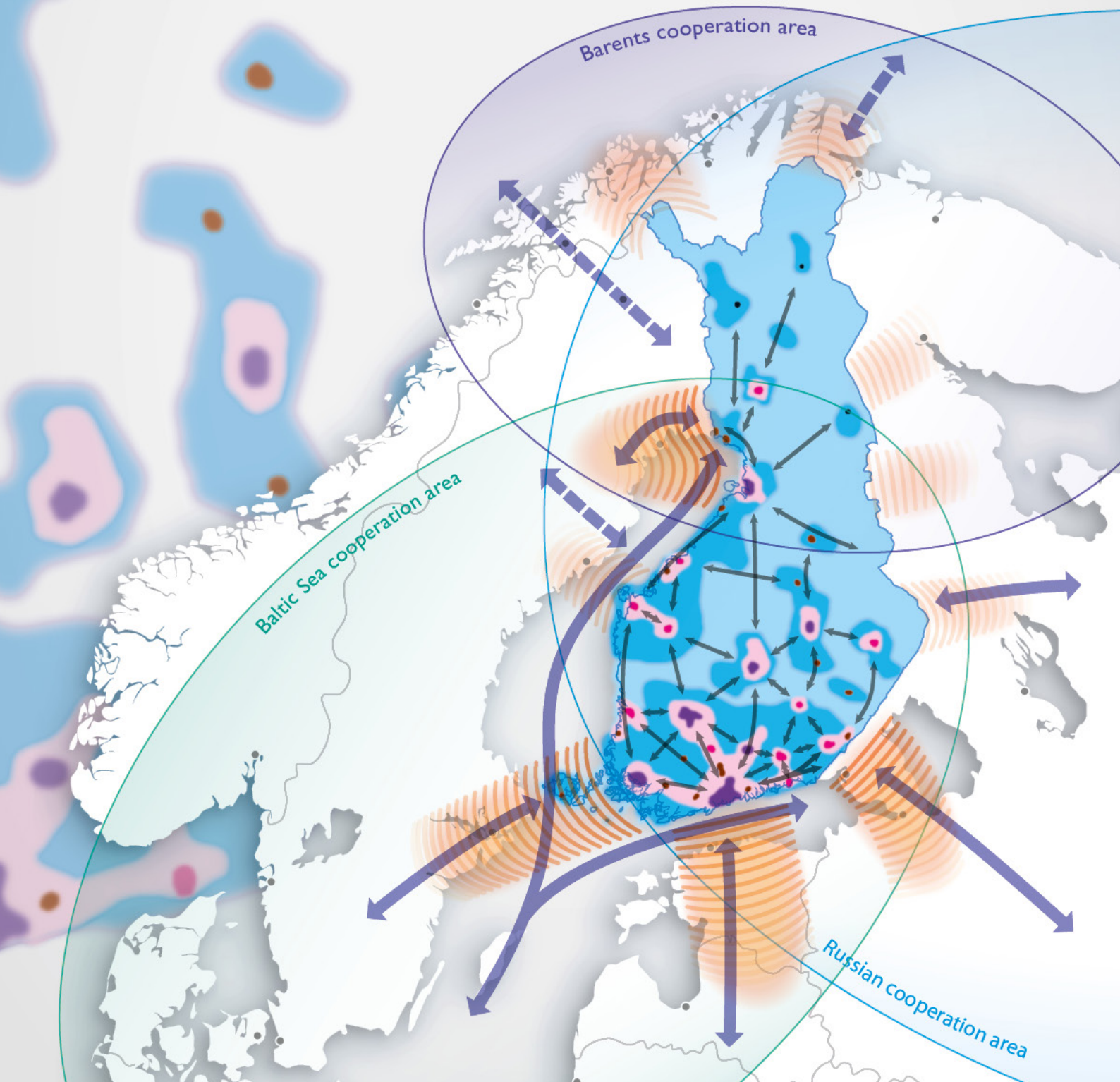
A renewable and enabling Finland

Development overview of the regional structure and traffic system 2050



Ministry of the Environment
Ministry of Employment and the Economy
Ministry of Transport and Communications
Ministry of Agriculture and Forestry

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FOREWORD

In the conditions of constantly accelerating internationalisation and increasing competition in the future, as well as for the sake of environmental sustainability, it is vitally important that the development of the Finnish regional structure and traffic system is based on a long-term overall vision. This makes it possible to promote Finland's development into a competitive, prosperous and low-carbon country.

Globalisation, the development of Finland's neighbouring areas and climate change will pose larger and larger challenges to the regional structure and the traffic system, and preparations for these challenges must be made in advance. It is particularly important to create the prerequisites for a change in the economic structure, moving towards a knowledge society based on bioeconomy and digitalisation. Continuing urbanisation and strengthening metropolitan development pose a considerable challenge to future development. In the quickly changing operating environment, the regional structure and the traffic system must endure changes, adjust to them and renew themselves.

This development overview forms a national view of the regional structure set as the target and the traffic system that supports it until 2050. The foundation pillars of the regional structure and traffic system set as the target include strengthening Finland's international position and creating a polycentric regional structure as well as developing traffic services and an enabling infrastructure. In the development overview, the regional structure and the traffic system have been defined by taking advantage of the special characteristics of the different parts of the country as well as regional strengths and division of labour. This makes it possible to facilitate the use of scarce resources as effectively as possible.

The development overview is based on the assignment given by the Finnish Government to the Ministry of the Environment, the Ministry of Employment and the Economy, the Ministry of Transport and Communications and the Ministry of Agriculture and Forestry. The preparation of the development overview has been carried out by a working group operating under the leadership of the Ministry of the Environment; in addition to the ministries, the Regional Councils, The Centres for Economic Development, Transport and the Environment and the Finnish Transport Agency have also been represented in the group. The preparation of the development overview has been based on forecasts for the future as well as consideration of various options and perspectives. The development overview has been prepared in interaction with interest groups, allowing the preparation process to offer the interest groups an opportunity to present their own views and to have a joint discussion on the development of the regional structure and the traffic system in the long term.

In particular, the development overview is targeted at the central government and the regional councils to provide support and background material for the long-term development work on the regional structure and the traffic system. The development overview also offers starting points for international spatial planning cooperation by presenting the Finnish point of view and cooperation needs.

We hope that the development overview of the regional structure and the traffic system will provide useful material for discussion on future directions, planning and decision-making, both among the authorities as well as all actors in society.

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Development overview of the regional structure and traffic system 2050

CONTENTS

ABSTRACT

Finland's target regional structure and traffic system by 2050

A stronger position for Finland globally, in Europe and in its neighbouring areas

The integration of the regional structure and cooperation in the northern areas of Europe expands the Finnish market area and reduces the disadvantages due to the country's remote location. Improving global accessibility strengthens Finland's external connections and integration with the rest of Europe, and more broadly the competence and value chains of global economy.

Finland's most important international cooperation areas are the Baltic area as an European growth area, the Barents area, especially due to its natural resources and new transport routes, as well as Russia as a large, developing market area. Cross-border cooperation zones are actively developed with Finland's neighbouring areas.

International transport connections to continental Europe as well as Russia and Asia in particular are developed. The sea connection via the Baltic Sea acts as the most important channel for foreign trade. The cooperation zones that connect the cities in the Baltic Sea area are developed as transport corridors that strengthen the connections with the European transport systems. In the northern areas of Europe, the connections serve the increasing cooperation as well as global transport. Helsinki-Vantaa airport is developed as an internationally competitive node for air traffic between Asia and Europe.

A polycentric, networking regional structure

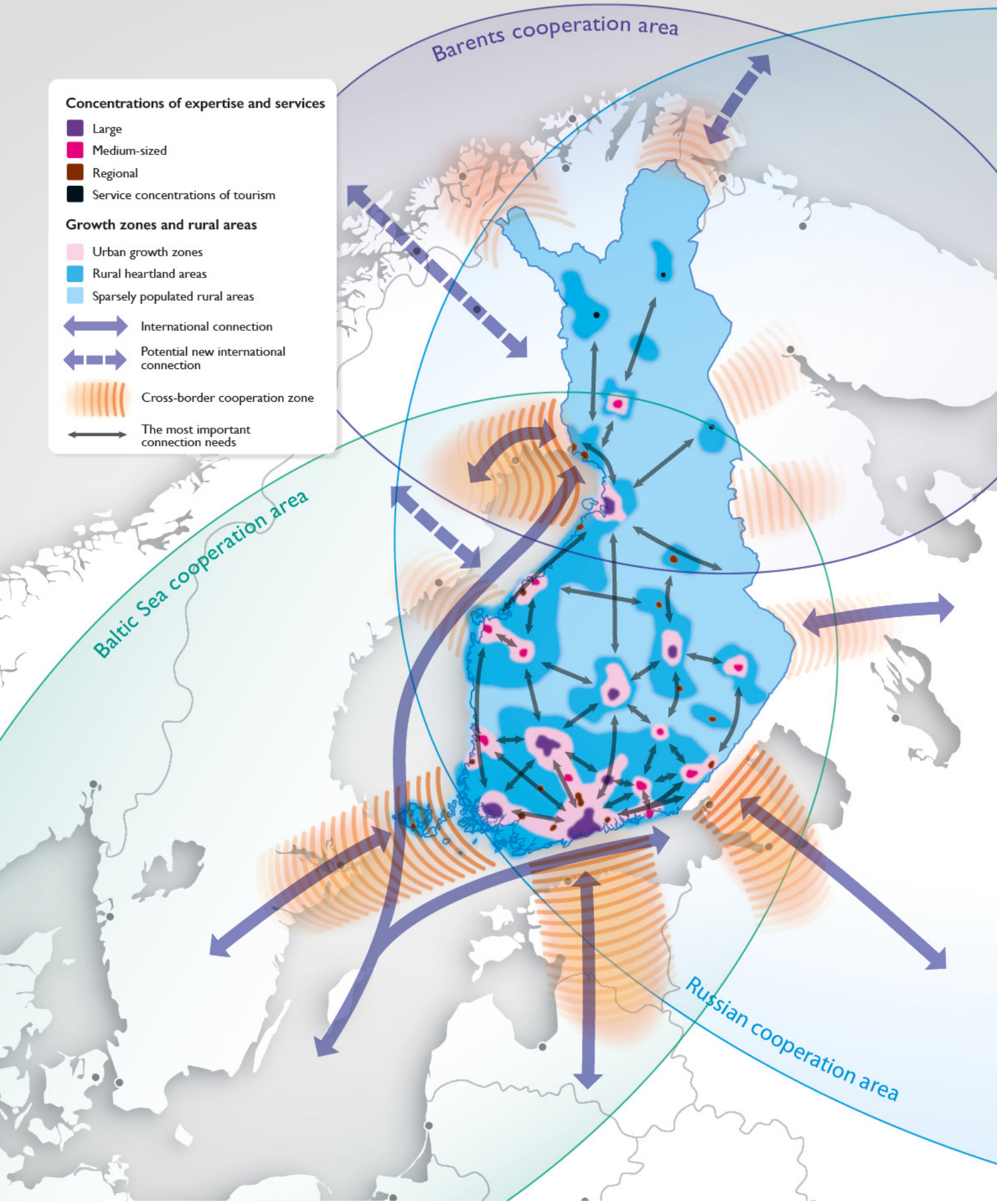
Developing a polycentric regional structure supports the utilisation of the strengths and resources of the different parts of the country in developing and renewing business activities. A regional structure that networks centres and rural areas and promotes their division of labour creates opportunities for extensive, diverse market and cooperation areas. Digitalisation and the polycentrism of regional structures ensures and promotes the availability of services and the development of specialised services. Digitalisation and new production technologies as well as bioeconomy and the natural resources economy create new opportunities for renewing business activities throughout the country.

A polycentric regional structure is based on functional centres and multifaceted cooperation between them. Large and medium-sized centres act as nodes in a polycentric and networking regional structure. Their interaction with the surrounding areas, each other and neighbouring areas in Finland is strengthened. The Helsinki region develops as a strong European metropolitan area and is linked to the other Finnish centres.

Developing traffic services and an enabling infrastructure

The developing traffic services are a response to citizens' changing mobility needs, and they create an opportunity for renewing the economic structure. Cost and resource efficient transport systems aggregate transport streams, are linked to international transport systems and are reliable in the event of potential disruptions. A service level-oriented approach in planning makes a functioning traffic system possible without wasting resources.

In freight transport, port connections are highlighted among connection needs, as are the connections between the Helsinki Metropolitan Area and the other largest centres in passenger traffic. The importance of the smooth flow of traffic within urban areas and the interaction of urban areas with their immediate surroundings increases with regard to both the mobility of citizens as well as business sector transport.



A goal-oriented development overview of the regional structure and traffic system 2050.

1. Introduction

The opportunities and boundary conditions offered by the regional structure and the traffic system have their effect on Finland's success. Society's functionality is influenced by the location of activities and the networks connecting different activities, such as the traffic and energy infrastructure and the data connections. The regional structure and the traffic system are a changing platform to be developed, which creates a basis for the population's living conditions and the operational preconditions of the business sector and influences the sustainability of the environment significantly.

Finland's northern location, large area and small population base make its regional structure unique and challenging in many ways. The regional structure is a diverse entity, where the special characteristics and locational factors of the areas are emphasised. The slowly changing basis of the regional structure has arisen from economic activity in particular – it has been shaped by primary production, utilisation of natural resources, industry, trade, and administrative structures. The current regional structure shows features of a society dominated by primary production, centres of employment built around industry and the hierarchy of centres created by inhabitation and services.

During the last few decades, there have been massive changes in the regional structure. Urbanisation has continued, and the population and jobs have concentrated in the largest urban areas in particular at the same time as their operational areas of influence have expanded. Out of the different industries, the share of primary production is only a few per cent, the share of processing industries has decreased to one third and the share of services has increased to more than 60 per cent. In the future, many factors of change, such as digitalisation, the global economy, climate change as well as changes in the availability of energy will affect the development of the regional structure and the traffic system by posing significant challenges to their development.

The factors affecting the development of the regional structure are often mutually conflicting and change quickly. Is essential for Finland's competitiveness that the regional structure and the traffic system provide the prerequisites for the renewal of industries and successful business activities, thereby supporting the stable and sustainable development of the economy. For the well-being of the population, it is essential that the regional structure and the traffic system ensure good living conditions and opportunities for living. In addition to this, the regional structure and the traffic system must promote a low-carbon approach and energy and resource efficiency as well as safeguard natural biodiversity and the good condition of the environment.

The actions of different regions, regional councils and municipalities as well as the different administrative sectors of the government affect the development of the regional structure either directly or indirectly. The national view of the regional structure that has been set as the target, the traffic system that supports it and the utilisation of potential resources create a common direction in which the parts reinforce each other.

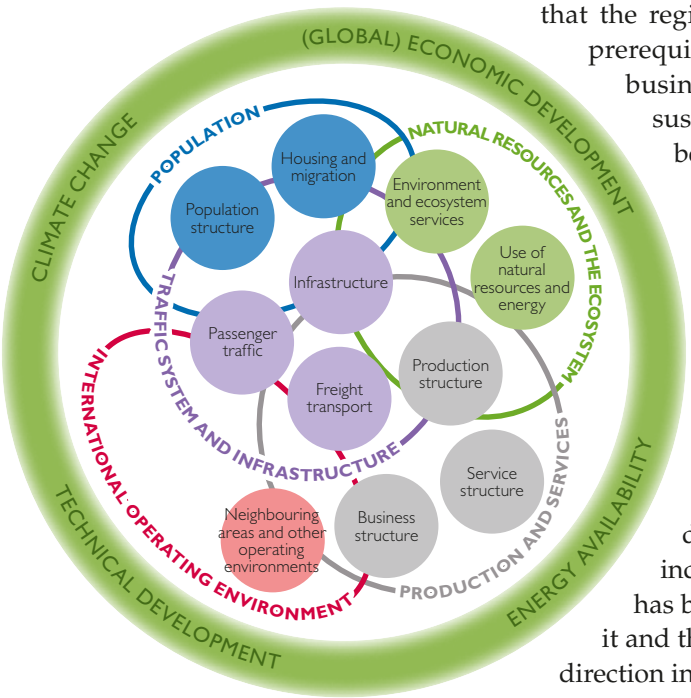


Figure 1. Factors affecting the development of the regional structure.

The regional structure describes the placement of activities and the way communities and areas develop and interact with each other and the way the traffic system supports development in a changing operating environment. The regional structure appears as communities of different sizes and the transport and communication connections that connect them, as well as other infrastructure and natural environment.

2. Outlooks for development

2.1

Globalisation and climate change present increasing challenges

Globalisation changes Finland's position

The rapid progress of globalisation is the most distinctive direction of social change in the current millennium. It is further accelerated, among other things, by the Internet and information networks, IT development, the development of logistics chains and transport connections, implementation of free trade and the increasing mobility of the production factors. Globalisation increases the interaction and mutual dependency of regions, states and continents.

The growth of Finnish wealth is largely based on globalisation. As a post-industrial knowledge society, Finland is one of the national economies that have been successful in the global economy. The good economic competitiveness is explained, among other things, by the stable social conditions, the developed institutions, the regionally comprehensive infrastructure and the population's high level of education. On the other hand, characteristics typical of the Finnish regional structure include long distances, remoteness, isolation, sparse population and a challenging climate. The production and business enterprise structure have adapted to these boundary conditions. On the other hand, Finland's cost level has risen faster than that of other countries, and Finland has lost market shares in international trade.

In global competition, the operational preconditions of many industries change easily along with the differences in productivity and costs between the locations. The advanced production process management methods and logistics systems make it particularly attractive for large international companies to organise their activities on a global scale. The typically labour-intensive stages are carried out in low cost level conditions, whereas expert tasks can be located anywhere depending on the workforce's competence and availability, the location of the main office or other factors.

It has been anticipated that Europe's relative position in the global economy and as a node of transit traffic will weaken. Despite migration towards Europe, the global population and economic growth are focused on Asia and South America in particular. For its part, population ageing will reduce the economic and political weight of Europe, the United States and Japan in the next few decades. In contrast, the importance of populous countries such as China and India in the global economy has been anticipated as increasing significantly during the coming decades.

With technical development, the digitalisation of the economy and robotisation, Finland's position in the global division of labour will also change. In industry, the division, distribution and outsourcing of production may continue. The automation of manufacturing may lower the production costs, making it possible for the production to move from countries with low labour costs back to the countries with a high digital readiness. The industrial Internet is an important competitive factor in constructing an automated, cost-effective production chain in countries with a high standard of living. Many factors emphasise the importance of a highly educated workforce in maintaining global competitiveness more and more clearly. The knowledge capacities of rising economies are developing continuously, which means that the competition for experts and high technology functions may increase and expand further.

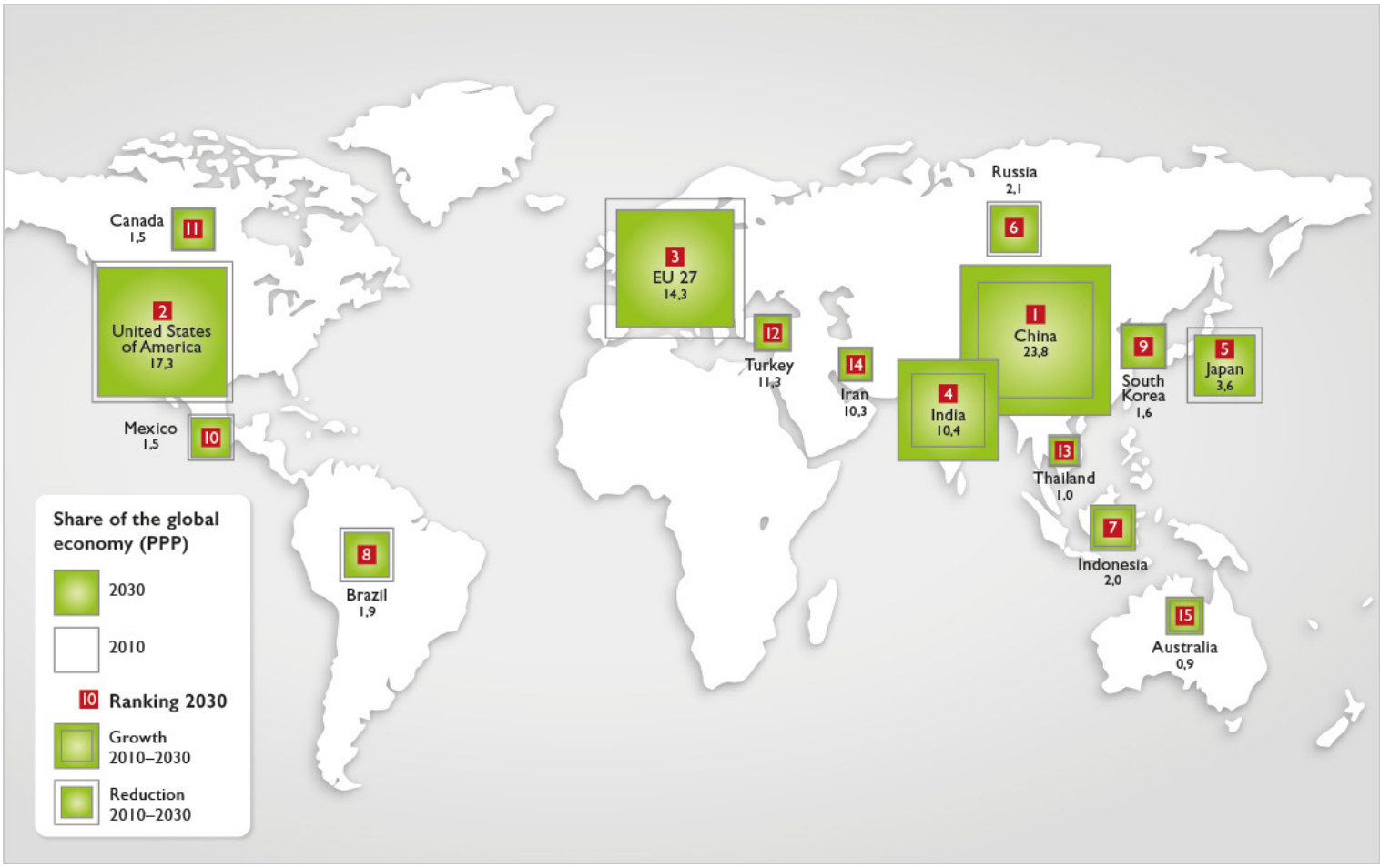


Figure 2. The world's 15 largest economic areas in 2010 and anticipated development until 2030. (ESPAS 2012)

The northern location creates opportunities

Increased international mobility, networking and other interaction have increased dependency between states, regions, communities and people. In Finland, their importance is strengthened by the economy's dependence on export and the relatively low level of self-sufficiency, which cause high transport needs. International cooperative relationships are exceptionally important to Finland due to the small size of its domestic market.

Finland's most important trading partners are the countries in the Baltic region. Their development, and the development of the EU economies in particular, is strongly reflected in Finland. Many of the developmental characteristics affecting the European growth dynamic negatively, such as population ageing and decline, and industry moving to developing countries, set boundary conditions on the development of the Finnish regional structure and the regional economies. On the other hand, Finland's strength is its location in the growing and stable economic area of the Baltic Sea, in close vicinity to Russia and in particular the growing markets in the St. Petersburg metropolitan area, as well as the natural resources opening up in the Barents area and the northern sea routes. In the EU, too, the development of maritime and coastal areas has been identified as an important strategy for economic growth.

When anticipating the development of Russia, the most important factors are the direction of the development of society, as well as the development of energy and raw material export and the operating environment of business activities. For example, a centralised, authoritarian Russia driven by large companies, or a modernising, diversifying and more mosaic-like business field, have been seen as alternative development paths for the operating environment of businesses.

Climate change and energy availability pose global challenges

Climate change, a low-carbon approach and resource efficiency extend through all activities of society. The largest direct effects of climate change are due to the changes in temperature

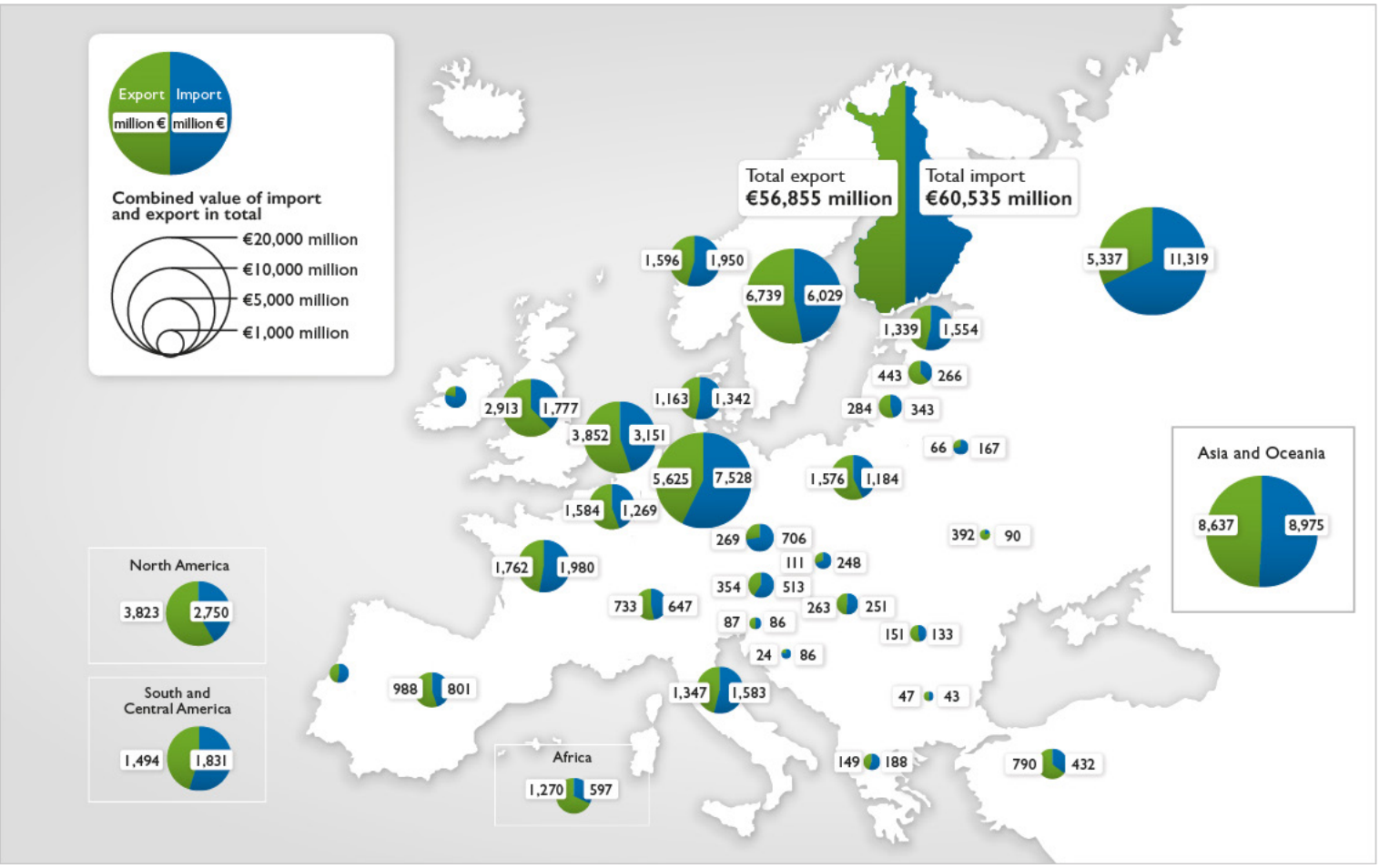


Figure 3. Amount of Finnish import from and export to different countries (2011). (Foreign trade statistics of Finnish Customs).

and precipitation. The rise of the water level may significantly reduce the viable land areas on the globe. In Finland, land uplift reduces the impact of the rising sea level, but as a result of torrential rain, the risk of flooding has also been anticipated as increasing in densely populated areas in particular. Areas at risk of flooding have been defined in Finland. Most of the approximately 20 areas at risk of flooding in Finland are located inland, next to water. In addition to the rising water level, the built environment is exposed to extreme weather phenomena, increased precipitation, erosion, earthfalls and changing ground frost conditions.

Climate change causes costs to Finland, but it also presents new opportunities. The goal of adaptation is to mitigate the negative effects of climate change and benefit from any possible positive effects. The increase in temperatures lengthens the growing season and allows for increased crops and the cultivation of new plant species in Finland. Forest growth may also increase. The reduced ice cover in the arctic region may open up new routes and natural resources for utilisation. The northern sea routes opening up as channels of world trade would shorten the sea route from Europe to Asia and America by thousands of kilometres and emphasise the importance of the Barents area as a northern node of global sea traffic.

The depletion of non-renewable energy resources, the increase in energy prices and reduced availability as well as the growing distribution costs have a global effect on land use and regional development. The certainty of energy availability and affordable prices promote economic growth. Like many other European countries, Finland is a net importer of energy, which increases its dependency on its neighbouring countries in particular. This exposes Finland to disturbances in energy transfer and trade and malfunctions in the technical systems. The importance of energy security and the utilisation of renewable domestic sources of energy will be highlighted in the coming decades.

2.2

Digitalisation and bioeconomy as the basis of a knowledge society

A renewable economic and business structure

As global competition increases and structural change intensifies, the economic and business structure is quickly renewed. Technological development – digitalisation, automation and bioeconomy – creates new opportunities for developing business activities in all areas. Social relationships, trade and the production and use of services occur increasingly through digital service networks. The companies also cooperate with each other as a part of international networks, which gives them a wider choice of locations. Digitalisation permeates the whole development of the society, and it is expected to become the basis for global activity. Digital service production and industrial Internet will change the operating procedures of both production as well as consumption permanently.

In addition to production based on digitalisation, rising sectors in Finland also include bioeconomy, natural resources economy and cleantech. In bioeconomy, renewable natural resources are used to produce food, energy, products and services. Finland's diverse forest resources and strong forest industry expertise offer excellent opportunities for developing versatile production based on bioeconomy. Cleantech refers to products, services and processes that promote the sustainable use of natural resources and reduce harmful emissions. Cleantech improves the competitiveness of industry and services through the efficient use of materials and energy. Finland's strengths in the cleantech business are, in particular, the resource efficiency of industrial processes, meaning energy, materials and water technology, as well as bioenergy, bio-based products and material recycling.

Service production increases – industry jobs decrease

The long-term trend in the economic and production structure has been the increase of jobs in the service sector and the reduction of production jobs. It is anticipated that this trend will also continue in the future. The digital service economy creates opportunities to renew the economic and service structure and increase productivity. Trade is a large employer, which is why its structure and location are highly significant for mobility, transport and the location of housing. Most trade activities are still focused on large units, whose areas of influence have expanded. Digitalisation and e-commerce alter the structure and operating environment of trade significantly by decentralising the services and activities into networks.

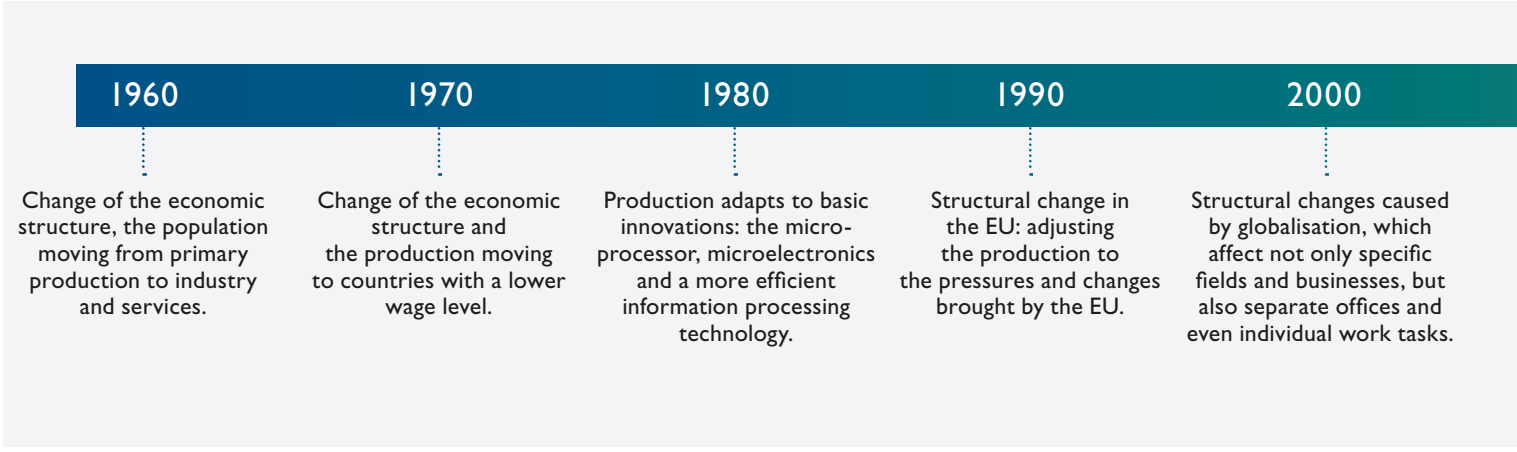


Figure 4. Waves of structural change that have occurred as well as ongoing or anticipated phases of structural change. (adapted from source: Alatalo & Tuomaala 2008)

As the population ages, the social and health sector has become an even larger employer than before, and the need for services continues to increase. Digitalisation also offers new opportunities for organising healthcare, where online services and modern devices people can use themselves are becoming increasingly common. The use of tourism and leisure services grows as wealth and leisure time increase. The growth of the service sector has many different kinds of effects on the formation of the regional structure, and it can promote urbanisation. On the other hand, it can be anticipated that the digital service economy will also improve the availability of services in rural areas.

The most important fields of industry in Finland are related to natural forest resources and metals, and in recent years, increasingly also to technology. Other important processing sectors include construction, energy production and mining. The ongoing structural change in industry changes the relevance of industrial production and that of the service export that relies on it. With globalisation and new technology, the interlinked production functions such as product development, manufacturing and assembly may be located geographically very far apart from each other. In industry, too, location-bound production units and clusters are losing their position to rapidly developing networks.

Industrial production has decreased during the last ten years in most sectors, particularly clearly in the paper and electronics industries. As a result of the structural change of industry, many traditional industrial areas have lost jobs and workforce. The transition to the use of digital media reduces the demand for paper products and encourages the development of new products. The rapid development of bioeconomy creates new opportunities for the further processing of wood. In the technology industry, the strength of Finnish export has been the manufacturing and design of specialised machines and equipment, around which significant regional concentrations of expertise have been created. The field of ICT has transformed, and its focus has moved away from manufacturing to software production, information system services and different kinds of expert services. There are many opportunities for the growth of the mining industry especially in the area of the North Calotte, where the largest ore reserves in the EU area are found. In recent years, the slow growth of the global economy has reduced investment in the mining sites in Northern Finland, but in the long term, production is expected to increase. The remote location of the mines away from transport connections requires special arrangements to be made for the transport and constructing the infrastructure.

Important service export opportunities have arisen in the technology industry sectors. The fields of mechanical engineering and energy technology and the assembly and forest industries in particular have a great potential for service export. In the future, services will be provided in increasingly larger packages, and the importance of factors such as

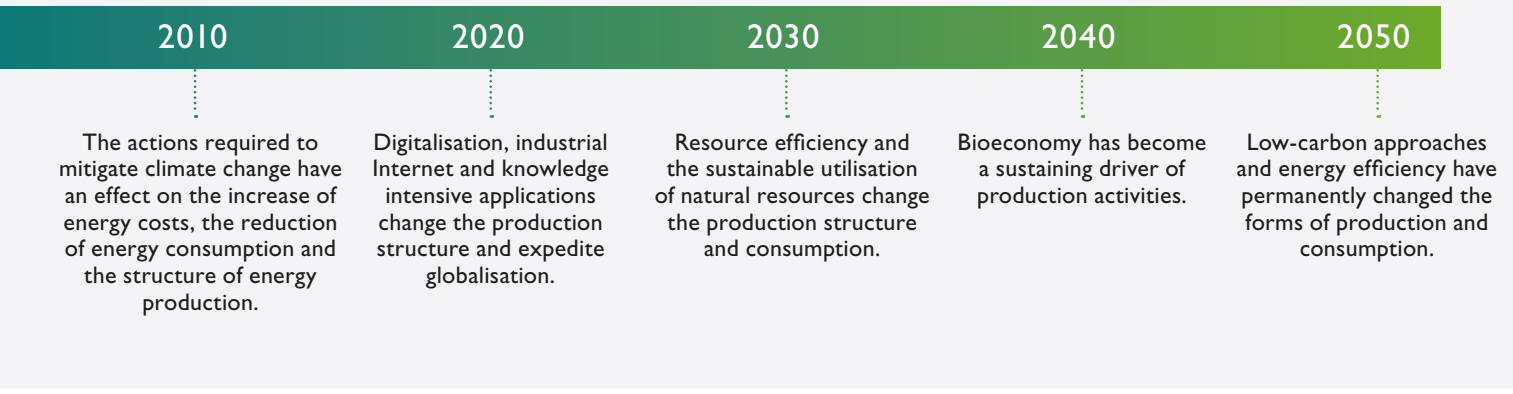


Figure 5. The main domestic road and railway transport streams and freight transport in ports (during the years 2007–2011).

The changes in the production and service structure are reflected in the regional structure and transport needs. The growth of bioeconomy changes the transport needs and export of the forest industry. The transport needs of a diversifying bioeconomy also require that the lower road network is developed and maintained. The regional specialisation of industry may highlight special development needs related to transport corridors.

Figure 6. Examples of regional strengths based on regional programmes and the distribution of business fields in the area.

Regional strengths are based on factors such as the economic structure, location, natural resources, knowledge capital and educational structure, service structure, traffic system and local conditions. The examples on the map have been collected from the regional programmes and the survey materials from the regional forums of the development overview.

service design will increase. According to an estimate by the VATT Institute for Economic Research, in 2030 more than three quarters of the annual added value will be produced in service fields, and they will employ more than 70 per cent of working Finns.

The number of small companies increases

The number of small and medium-sized enterprises has clearly increased in recent years, and at the same time, the number of large enterprises has decreased. The increased demand for services increases the number of small and micro-enterprises. Some of the jobs in industry have also moved to the service sector, and small service providers are responsible for many outsourced industry functions. The reduction of jobs in large enterprises has increased entrepreneurship and the number of small enterprises. Innovation and start-up activities and entrepreneurship are becoming an increasingly important direction of development in the business sector. Most of the new service companies emerge in growth centres and their peri-urban areas, where the population offers sufficient demand and there is a competent workforce available.

The operating environment of companies is constantly changing in the global markets. Success in the worldwide procurement and market areas requires finding cooperation networks in which the companies' production structures and competence areas complement each other.

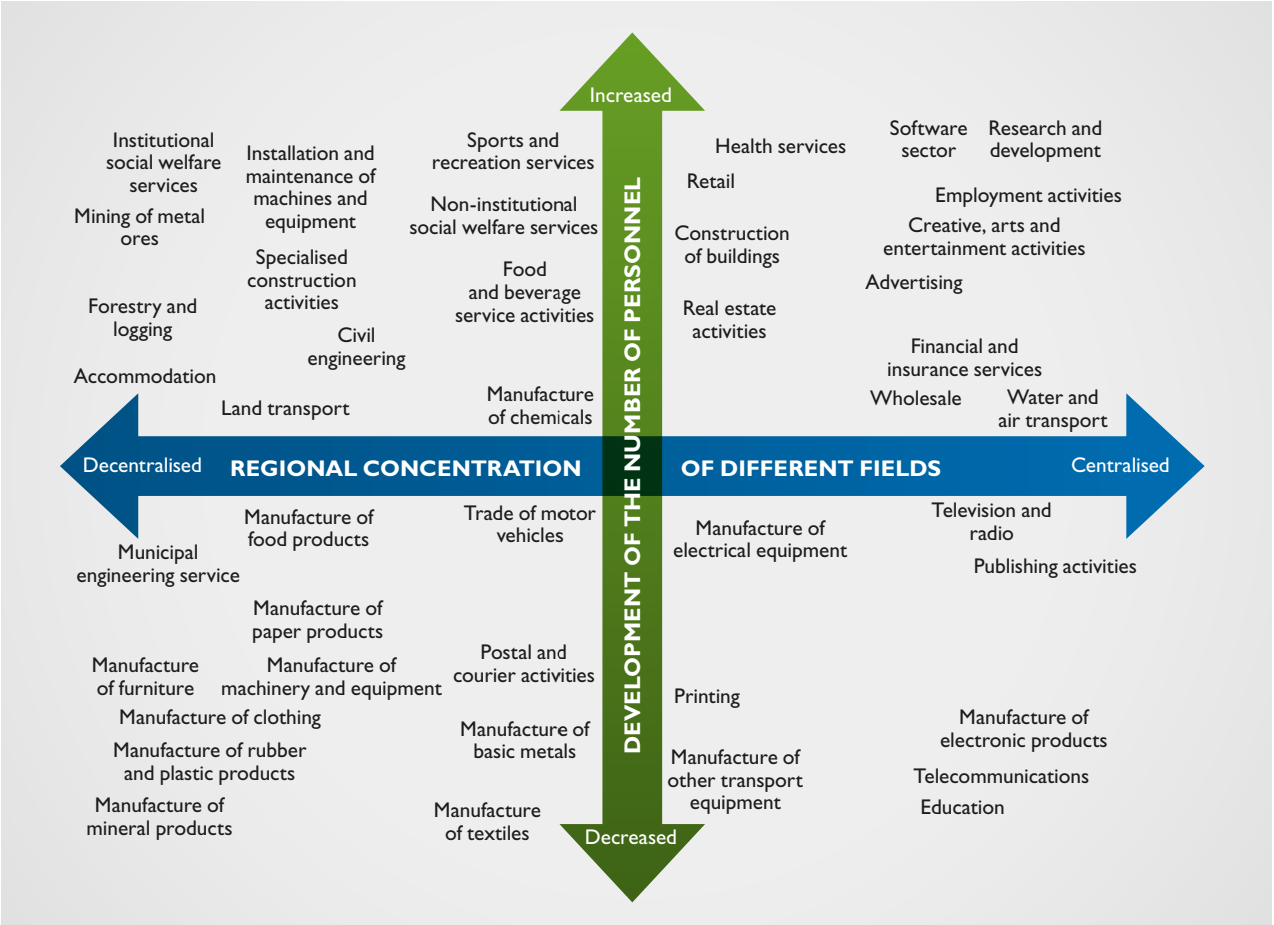


Figure 7. Regional change and development of number of personnel in Finland from 2006 to 2011. (SYKE, Statistics Finland)

The centralisation of business activities and the labour market will continue, but opportunities for decentralisation will also arise.

The regional concentration of entrepreneurship and business activities is a long-term trend linked to the development of urbanisation. Centralisation has been intensified by the closing down of large production facilities or their reduction in traditional industrial areas The increasingly service-oriented society and the specialisation of the labour market also favour the concentration of functions. Several growing fields benefit from the agglomeration in the largest urban areas, where they are located in the vicinity of other companies and markets. Companies require from their location a sufficient supply of competent workforce and support for development activities. On the other hand, prerequisites for decentralisation also exist. Digitalisation and its efficient utilisation provide opportunities to decentralise production and operations. In addition to this, the increasing use and refinement of natural resources create new jobs outside the centres, especially in bioeconomy and mining activities.

The labour market has concentrated in large urban areas due not only to the location of companies and jobs, but also the concentration of the network of educational institutions. Knowledge structures – educational institutions, research institutions, companies – are an important engine of regional development, whose importance increases as the technology-oriented digital economy strengthens. Universities and universities of applied sciences are important experts and innovators in the regions together with experts from companies. Vocational institutions also play an important role in developing practical innovations and applying them to the needs of small companies in particular.

A diverse educational offering attracts young adults to urban centres where universities and universities of applied sciences are located. There are also pressures for change on the network of educational institutions; for example, upper secondary and vocational education are decreasing in small areas. The educational offering of an area is an important factor in developing the companies' operating environment and particularly in ensuring the availability of competent workforce.

2.3

Urbanisation continues and metropolitan development strengthens

Urbanisation continues

Urbanisation is an important trend that moulds the regional structure. In Finland, the proportion of the population that lives in cities and peri-urban areas has increased from 61 per cent to 70 per cent within the last 35 years. In Sweden and Denmark, for example, urbanisation has progressed further than in Finland.

In the recent decades, urbanisation has changed so that growth increasingly clearly occurs in the largest cities. Medium-sized centres have maintained their position during the development, but many of the smaller centres have slowly changed into areas with decreasing population. Migration is an important phenomenon that changes the regional structure, and there are many factors behind it. The change of the economic structure also affects the development of urbanisation directly. Diverse areas that offer education and expert work gather immigrants. Growth creates new jobs in the service sectors. Centres that offer extensive higher education are successful, when there is an increase in jobs that require education and special expertise.

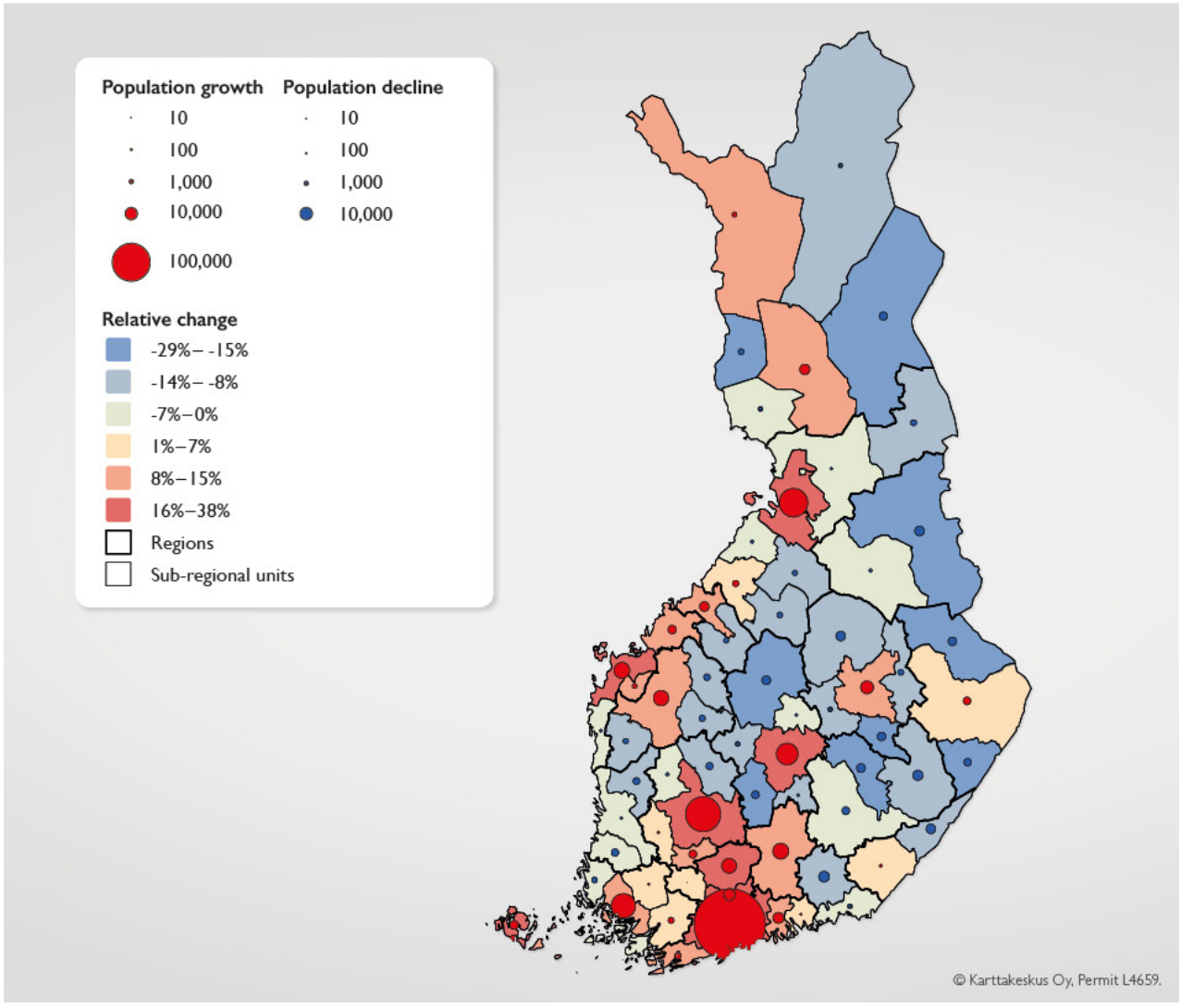


Figure 8. Population forecast by sub-regional unit 2011–2040.
According to the trend forecast, the population will concentrate in the large urban areas. (Statistics Finland)

Migration within the country has long been directed towards urban areas. The largest urban areas and the growth zones in Southern Finland have received the largest positive migration gain. In terms of age groups, young people and young adults form the largest group of migrants. A significant proportion of young adults that are starting out their employment move to the largest cities in particular.

According to the trend forecast by Statistics Finland, it is likely that urbanisation will also continue in the future. The forecast indicates that in 2050, approximately one half of Finns may live in the four largest sub-regional units and the growth of the metropolitan area in particular would continue to be rapid. The development is a result of global networking and the growth of the role of large cities. In the future, the growth of the rest of the largest urban areas will be increasingly built on natural population growth and immigration. The future development of medium-sized urban areas depends particularly on the location of services, such as institutes of higher education and public special services, as well as the development of dynamic business activities and a diverse economic structure.

Immigration has an increasingly large impact on the population structure. The number of immigrants has grown rapidly in the 2000s, and the numbers can be anticipated as remaining at the current level or increasing. Immigration brings new inhabitants and workers to areas suffering from population loss, too. However, most of the immigration is directed towards urban areas, and educated immigrants in particular settle in the largest centres.

The areas of influence of urban areas expand and interaction between them increases

The surrounding municipalities also benefit from the positive migration gain of central cities. The sub-centres of the largest cities' peri-urban areas grow and correspond to the size of small city centres. The migration is also visible within the urban structure, where it has induced growth in the cities' fringe areas. In recent years, city centres and traditional suburbs have become more popular as living environments in the largest urban areas.

The urban commuting and business areas have expanded. Increased mobility has reduced population growth in cities and increased it in the areas surrounding the cities. Close to 90 per cent of Finns live within the areas of influence of urban centres. The functional areas will expand further in the future, when some of the small centres outside the cities' areas of influence will be functionally more closely attached to the large centres. The development of functional areas will diverge, whilst the relative attraction of most of the smaller cities will fade. In addition to this, population growth will be directed to the development corridors that form around the larger main transport routes that connect cities.

The metropolitan area will expand even further and become more polycentric. The metropolitan commuting area will expand to the largest cities in the neighbouring area. Most of Southern Finland is in the metropolitan area's sphere of influence, while the role of the Helsinki Metropolitan Area as the centre of the metropolitan area remains strong.

The decrease of rural population evens out

The population growth in cities and the reduction of rural settlements will even out during the coming decades. The wide-ranging development of bioeconomy also creates the prerequisites for a more regionally balanced development. The utilisation of natural resources creates new jobs and a functioning digitalisation enables work and education regardless of location in rural areas.

Declining development threatens in particular the rural fringe areas, which are far away from the larger centres. Even there, food production and the processing and other kinds of utilisation of natural resources ensure that the infrastructure remains in use. New leisure services and seasonal forms of use also maintain the vitality of these areas. In sparsely populated areas, local and tourism centres that bring together services and business form the basic structure of the network of centres.

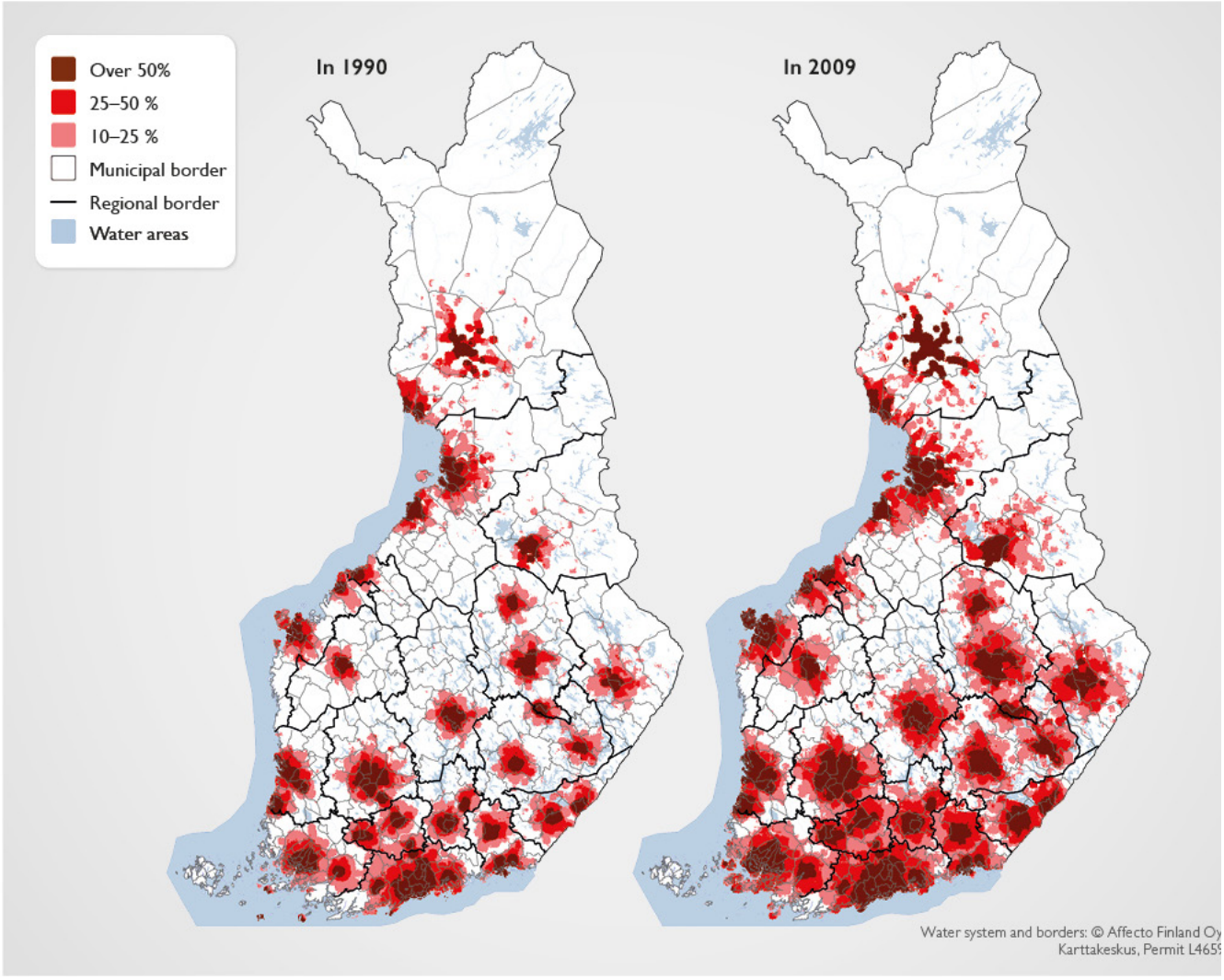


Figure 9. Areas of influence of urban areas from the point of view of commuting in 1990 and 2009.
(SYKE, Statistics Finland)

Population ageing is visible in different ways in different areas

Population ageing will have a significant effect on the Finnish regional structure in the coming decades. The number of children, young people and the working population will only increase significantly in the largest urban areas and the rural areas near cities. The number of pensioners will increase everywhere. The dependency ratio will weaken and it will be more difficult to fund public services. There may be a labour shortage in some areas and sectors.

It is anticipated that the number of people over 65 years of age will increase from the current approximately one million to almost 1.6 million in 2040. The change will be greatest in the largest urban areas, but the proportion of the total population made up of the elderly will be the largest in small sub-regional units. Pensioners are better off than before, which increases the demand for private services. The increasing number of very elderly people increases the workforce need in the care sector and other service sectors.

The size of the age group made up of children and young people will increase somewhat, but only in a small part of the regions. The network of educational institutions and the offering of educational fields will follow the changes of the age structure. Most of the age groups moving on to secondary and tertiary education live in cities or move there.

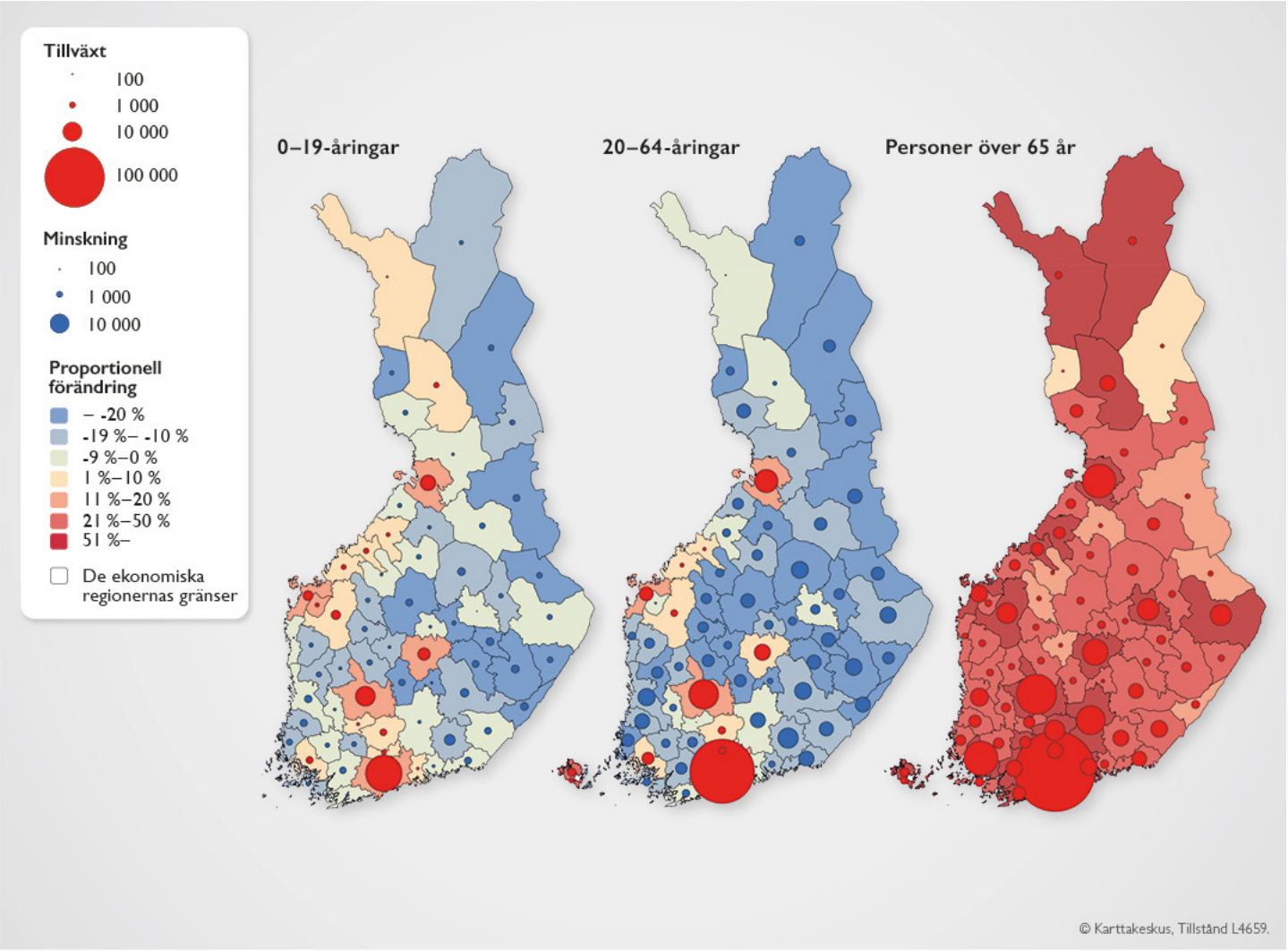


Figure 10: Development of age structure according to the population forecast by sub-regional unit during 2011–2040. (SYKE, Statistics Finland)

Multilocality changes the housing structure

Having multiple dwellings has changed the forms of housing, and a permanent place of residence describes the regional structure based on the use of time less and less accurately. The location of people changes according to seasons and time, such as between weekdays and weekends. With remote work, even everyday living melds together with different locations. When looking at the average location of people, the urbanisation development appears much more moderate than when based on permanent housing alone. This is highlighted particularly in the areas that attract the purchase of second homes and tourism. Having multiple dwellings also creates new kinds of transport and data communication needs.

The differences in migration between areas are also increasingly due to non-material factors. The importance of the living environment in choosing a place of residence will increase in the future. The largest cities offer multifaceted environments for an urban way of life. On the other hand, the countryside offers space and the peace of nature as well as lower housing costs than the cities.

3. Guidelines for developing the regional structure and the traffic system

3.1

A renewable economic and business structure strengthens competitiveness

A functional regional structure and an effective traffic system are important parts of the companies' and citizens' operating environment. Companies linking into the international competence and value networks require global accessibility and good data connections. Finland's stable development as a society, functional infrastructure, high level of competence as well as spacious and clean environment form an internationally competitive operating environment that must be cherished and developed.

The positive economic development of Europe and other export locations is important to Finland. The strengthening of the European Union requires cooperation, specialisation and division of labour from its member states. Finland must take advantage of opportunities related to the utilisation of natural resources in the northern areas of Europe as well as the sea routes that are opening up. Finland's position as an intermediary in the Baltic Sea and Barents areas and the improvement of accessibility in the neighbouring areas expand companies' market areas and operating opportunities. These factors also reduce the disadvantages of the remote location and provide an opportunity to implement environmentally sustainable solutions.

The regional structure and traffic system create the prerequisites for strengthening, diversifying and renewing industries so that the strengths and resources of different areas can be utilised as efficiently as possible. The regions' relatively functional network and infrastructure provide a good starting point. Education services and other competence structures are becoming centralised, but as a whole, there are both public and private services comprehensively available throughout the regions. The conditions for utilising natural resources in different parts of the country are good. The developing regional structure and traffic infrastructure promote the division of labour and interaction between regions and strengthen business activities all over the country. Good availability is a prerequisite for the utilisation of regional strengths and attraction factors.

GUIDELINES FOR A RENEWABLE ECONOMIC AND BUSINESS STRUCTURE

- Strengthening the position of companies in international networks and production chains
- Developing the prerequisites for cooperation between companies both globally and in the Baltic Sea and Barents areas in particular
- Strengthening the structures that renew the industries and promote cooperation in the regions
- Strengthening regional expertise by promoting the application of digitalisation and the introduction of new technology
- Ensuring the availability and sustainable use of raw materials for the needs of the developing bioeconomy and natural resources economy

3.2

The well-being and living conditions of the population improve

The well-being and employment of the population and the availability of services require a functioning network and sufficient transport connections all over the country. The concentration of population in the largest cities and their peri-urban areas as well as the diminishing development in other areas present large challenges to the balanced development of the regional structure and traffic system. Population ageing also affects the development of social and health care services in particular, but also the traffic services. In growing areas, growth management requires improving the ability of communities to function, which is linked to good public transport connections, a comfortable and safe living environment and a sufficient supply of housing. Correspondingly, it must be possible to take care of organising services and their availability in areas with decreasing population. For the ability of the built environment and the infrastructure to function, it is important to take account of changes in weather and water conditions and extreme weather phenomena becoming more common.

For the well-being of the population, it is essential that employment in the regions has a solid base. For the supply and demand of labour in the expanding commuting areas to meet, the workforce must be mobile and the traffic services functional. A diverse, accessible service network is an important requirement for the well-being of the population. Digitalisation and the intelligent traffic system applications create new preconditions for the availability of services, sustainable mobility, having multiple dwellings and more flexible employment.

GUIDELINES FOR IMPROVING THE POPULATION'S WELL-BEING AND LIVING CONDITIONS

- Promoting the regional supply of jobs meeting the demand as well as the mobility of jobs and the workforce, and developing functional commuting areas
- Ensuring the availability and accessibility of services as well as the existence of a network of centres and services and traffic services that support inclusion
- Maintaining and developing the ability of communities to function as well as a good, safe living environment in all areas
- Sustainably promoting multilocality, more flexible employment and the supply of services by developing intelligent communication and traffic services
- Improving the quality of the living environment by utilising the attractive natural and cultural environment

3.3

A low-carbon and energy and resource efficient society

In order to mitigate the effects of climate change, it must be possible to reduce the amount of greenhouse gas emissions considerably and transition to a low-carbon approach in the long term. This requires transitioning to low-carbon energy production, reducing energy consumption and increasing energy efficiency. Finland is committed to reducing carbon dioxide emissions under international agreements.

Sustainable development also requires material and energy efficiency, promotion of circular economy and transitioning to the use of renewable natural resources. Improving resource efficiency and promoting circular economy preserves natural resources and assists in producing more with the current resources.

The regional structure is developed and natural resources utilised while also safeguarding the natural biodiversity and the ecosystems' ability to provide diverse benefits, ecosystem services. Ecosystems offer services that are central to both the development of industries and the well-being of the population as well as environmental sustainability.

The functionality of ecosystems is also essential from the point of view of adjusting to climate change. The diverse development of forestry and rural industries offers opportunities to promote bioeconomy and produce biomass.

Urbanisation and development of centralisation increase the use of natural resources and weaken the eco-efficiency of the existing structure in declining areas. New construction in growth areas may improve energy efficiency. The management of both decline and growth as well as new intelligent solutions are needed to increase sustainability.

The opportunities of a sustainable way of life and economy are developed based on the regions' own starting points. Sustainability is assessed as a part of the global operating environment. Self-sufficiency is increased particularly in functions important to the security of supply, such as food and energy supply.

The special characteristics of regions in the different parts of the country are taken into account in improving the quality of the environment and the state of nature. The functioning of ecosystems, the benefits derived from them and the effects of human activity on ecosystems must be studied as a whole.

GUIDELINES FOR A LOW-CARBON, ENERGY AND RESOURCE EFFICIENT SOCIETY

- Promoting development in which fossil fuels are used as little as possible and in which as little greenhouse gas emissions are created as possible
- Promoting resource efficiency, circular economy and the use of domestic, renewable sources of energy, and developing bioeconomy based on the use of renewable natural resources.
- Strengthening the functionality and adaptability of ecosystems as well as natural biodiversity
- Making the use of existing structures and infrastructure more efficient
- Increasing self-sufficiency in natural resources economy and functions important to the security of supply, such as food and energy supply

4. Finland's target regional structure and traffic system

4.1

A stronger position for Finland globally, in Europe and in its neighbouring areas

Finland participating in global networks

Global competitiveness is the prerequisite for Finland's economic growth. Finland's competitive advantages include the functionality, stability, reliability and safety of society and infrastructure. Intelligent, well-functioning and sustainable societies are internationally competitive operating environments for housing, business activities and tourism. The opportunities for growth and global competitiveness are affected by how inspiring and enabling the environment in which the inhabitants, communities and companies operate is, and how they can connect to virtual environments.

In the global economy, companies become international and network globally. It is important to belong to networks, because they determine the company's position in the international production value chains. In a global operating environment, anticipating changes, preparing for the actions they require and risk management are challenging propositions.

Finland's industries and businesses that rely on renewable resources as well as the related competence and service export are the drivers of increasingly international business activities and cooperation. Finland has the opportunity to become a pioneer of bioeconomy and the innovative and sustainable use of natural resources. The global demand for raw materials increases as the middle class in developing countries becomes wealthier. At the same time, the demand for further processing of natural resources increases continuously. They influence the future development of regional structure and the need for transport connections in many ways and in all parts of Finland.

Finland's competitiveness is affected by the effectiveness, reliability and regional coverage of international connections. Their high level increases Finland's accessibility. As a result of global digitalisation and the spread of knowledge economy, increasing demands are placed on the level and accessibility of Finland's international data communication services, too.

Trips made within one working day are important in international passenger traffic. There, Finland's international connections rely on air traffic, with the exception of St. Petersburg and Tallinn, which can be visited in one day using fast train and ship connections.

The structural change of industry has changed transport routes and lengthened transport distances. In addition to this, the developing international division of labour, specialisation and the distribution of production further increase transport and traffic, both within Finnish borders as well as globally and in Finland's neighbouring areas.

Accessibility changes slowly, and improving it requires long-term, consistent policy definitions regarding the traffic system. In the EU, these policy definitions apply to the Europe-wide transport networks (TEN-T), which are also central to Finland's international connections. The traffic policy of the EU has focused on Central and Southern Europe as well as developing transport within Europe. When defining the guidelines for the EU's traffic policy, Finland must emphasise a decentralised, multipolar view and highlight the importance of connections outside the EU. For Finland, this means matters such as recognising Finland as a node of air traffic from the EU to Asia, a bridgehead of the EU to North-West Russia and a logistics node of the EU to the North Sea and the Barents area.

Utilising the opportunities in the Baltic Sea area

Both the EU and the Baltic Sea area markets are important enablers of sustainable growth for Finland. To the south, Finland's connections are influenced by the Baltic Sea, which makes Finland an island from the perspective of Central Europe. The countries in the Baltic Sea area are Finland's most important trading partners, and interaction between the countries will continue to grow in the future, too. The growth of the Baltic Sea area within the EU has been faster than in Southern Europe in the recent years, and the economy of the Baltic Sea countries has developed better than the other areas during the economic recession in the EU. The importance of the Baltic Sea area as a domestic market route in the region as well as a sea route is increasing. Development is the strongest in the northern growth corridor reaching from Oslo via Stockholm and Southern Finland, Helsinki in particular, to St. Petersburg.

The connections between Finland and Sweden will also continue to be important in the future both in Helsinki and Turku but also the Vaasa region, the Bothnian Arc and Western Lapland. The Vaasa region will remain linked to the Västerbotten region in the future, too, and the cooperation between the regions will develop strongly. The development of the Bothnian Arc will strengthen the position of Oulu as a centre of expertise in the Bay of Bothnia region and promote the increasingly close cooperation in the northern areas between Northern Finland, Norway, Sweden and in the future also North-West Russia.

The Helsinki–Tallinn twin city development strengthens. The labour market in Estonia and Finland will develop and equalise so that commuting will become genuinely bidirectional as the differences between the living standards in Finland and Estonia diminish. The Rail Baltica railway connection and the potential tunnel between Helsinki and Tallinn would strengthen the twin city development.

Issues important to the distribution of energy in the future are the development of international energy networks in the Baltic Sea, the potential of arctic wind power expertise and natural gas import channels. The effective use of the Nordic electric power network and connecting Russia as a part of it are also important issues.

Russia has considerable potential in the long term

Russia is one of Finland's most important trading partners, and interaction with it is significant in many other respects, both now as well as in the future. The connections that cross the eastern border are geographically particularly important for the development of Southeast and Eastern Finland, but their effects extend throughout the country. Russian tourism has already created new jobs, and it – as well as migration from Russia – also benefits areas around the southeastern and eastern border, whose development overview has been recessive due to changes in the production structure. The future development trend will naturally also depend on the development of the relationship between Russia and the EU. For example, visa-free border crossing would increase cooperation between businesses and commuting over the eastern border, in addition to tourism.

The importance of St. Petersburg for Finland in particular is increasing as far as tourism, commuting and business traffic are concerned. Nevertheless, the development of the connection with Russia and actively improving it applies to taking advantage of the potential of our eastern neighbour, not only connections with St. Petersburg and further with Moscow. For example, the Republic of Karelia and the whole of North-West Russia are also important sources of natural resources for Finnish industry.

The importance of transport corridors to Russia will increase in the future, because they are also important transit routes to Asia and the growing Caucasus region. This is reflected in the lateral connections in central Finland, because the growing traffic needs and the development of the road and rail network on the Russian side increase the demand. The common gauge with the Russian railways facilitates strengthening the international transport corridors to the east, even if utilising this potential is greatly dependent on the international position and strategy of Russia.

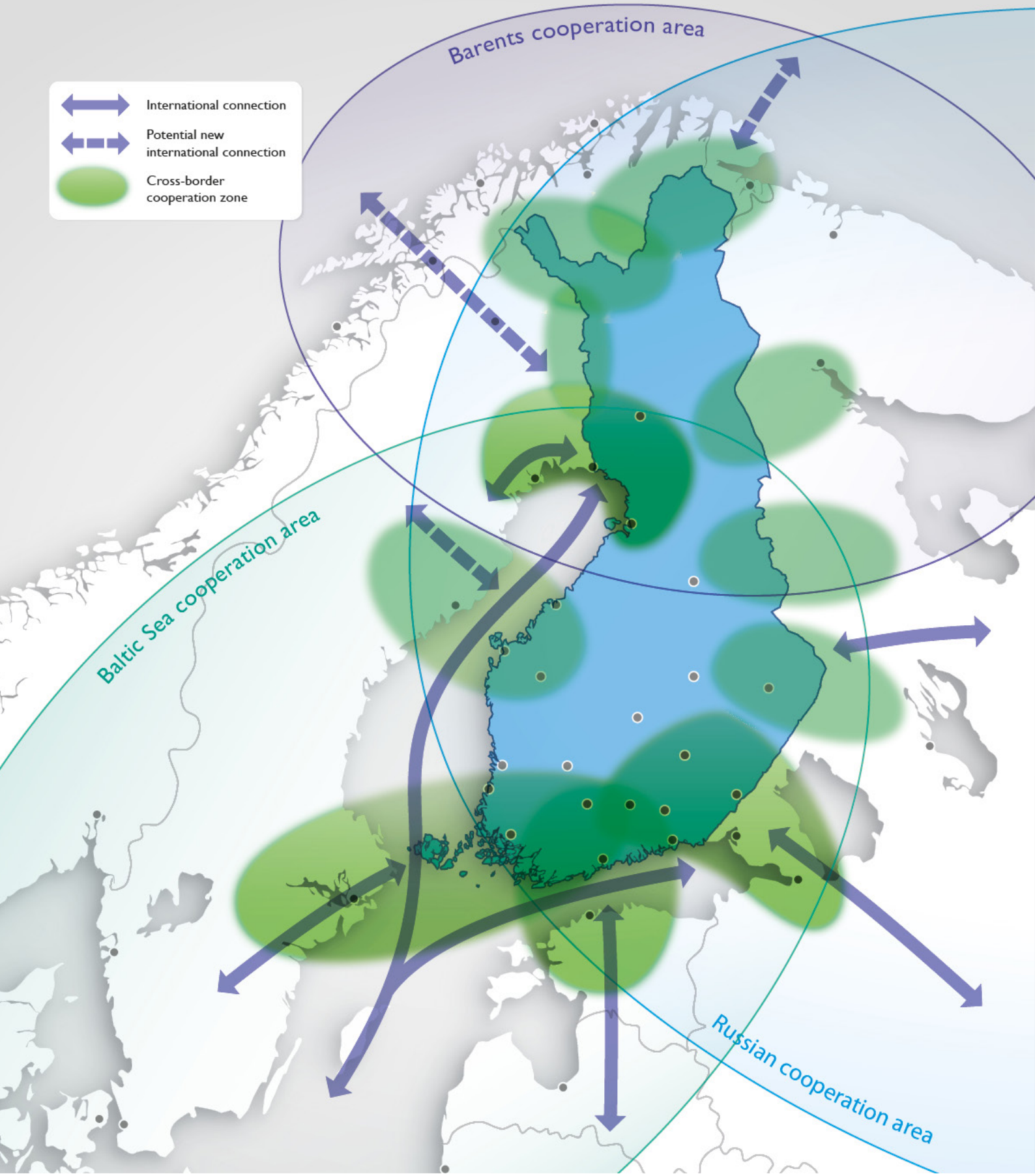


Figure 11: Finland's most important international cooperation areas and zones and connection needs with regard to the regional structure until 2050

Finland's most important international cooperation areas are the Baltic Sea area as an European growth area, the Barents area due to its natural resources and new transport routes in particular, and Russia. Cross-border cooperation zones are actively developed. The key cooperation zones with regard to Finland's role as a mediator are the northern Baltic Sea area zone of Stockholm–Turku–Helsinki–St. Petersburg, the Helsinki–Hämeenlinna–Tampere zone that continues on to Tallinn, and the Bothnian Arc.

Significant outlooks for development in the Barents area

The transport and data communications routes, raw materials and energy resources in the northern regions will open many new development opportunities for the whole of Europe in the future. The retreating sea ice due to the Arctic region warming up will enable year-round ship traffic in the northern routes and utilisation of natural resources in the area. The energy resources in the north are interesting, because it has been estimated that more than one tenth of known oil resources and more than one fifth of gas resources are located in the Arctic areas.

Nordic cooperation in the Barents area cooperation is highlighted. Finland's Arctic expertise in the fields of marine industry, energy industry and clean technology, amongst others, is developed systematically. As the expert in the special characteristics of Arctic areas and environmental expertise, Finland may play an important role in international cooperation.

It is estimated that in the coming decades, the northern sea routes will make up a significant market share of the routes to Asia and America. Finland has multidisciplinary technology expertise that enables transport via the northern routes. Finland can utilise the northern transport routes primarily in its own export and import transport to Asia and America. Finland should be prepared to use the ports in the Arctic Ocean in its own transport to Asia through transport corridors to the Norwegian ports, for example. In the development of the Arctic areas, a simple stream of raw materials in transit through Finland is not desirable; instead, the goal is to enable their further processing and producing added value in Finland. The infrastructure investments connected to the northern sea routes are interlinked, and they often also have an international dimension. For this reason, development of the Arctic connections in Finland must be reviewed in a coordinated manner in cooperation with neighbouring countries and the EU.

It has been anticipated that in the future, the northern routes will open up possibilities for constructing data networks in addition to sea traffic. In the event that a northern data connection cable between Europe and Asia should be realised, Finland would be located at the centre of the European and Asian data streams, which opens up possibilities for the location of data intensive industry.

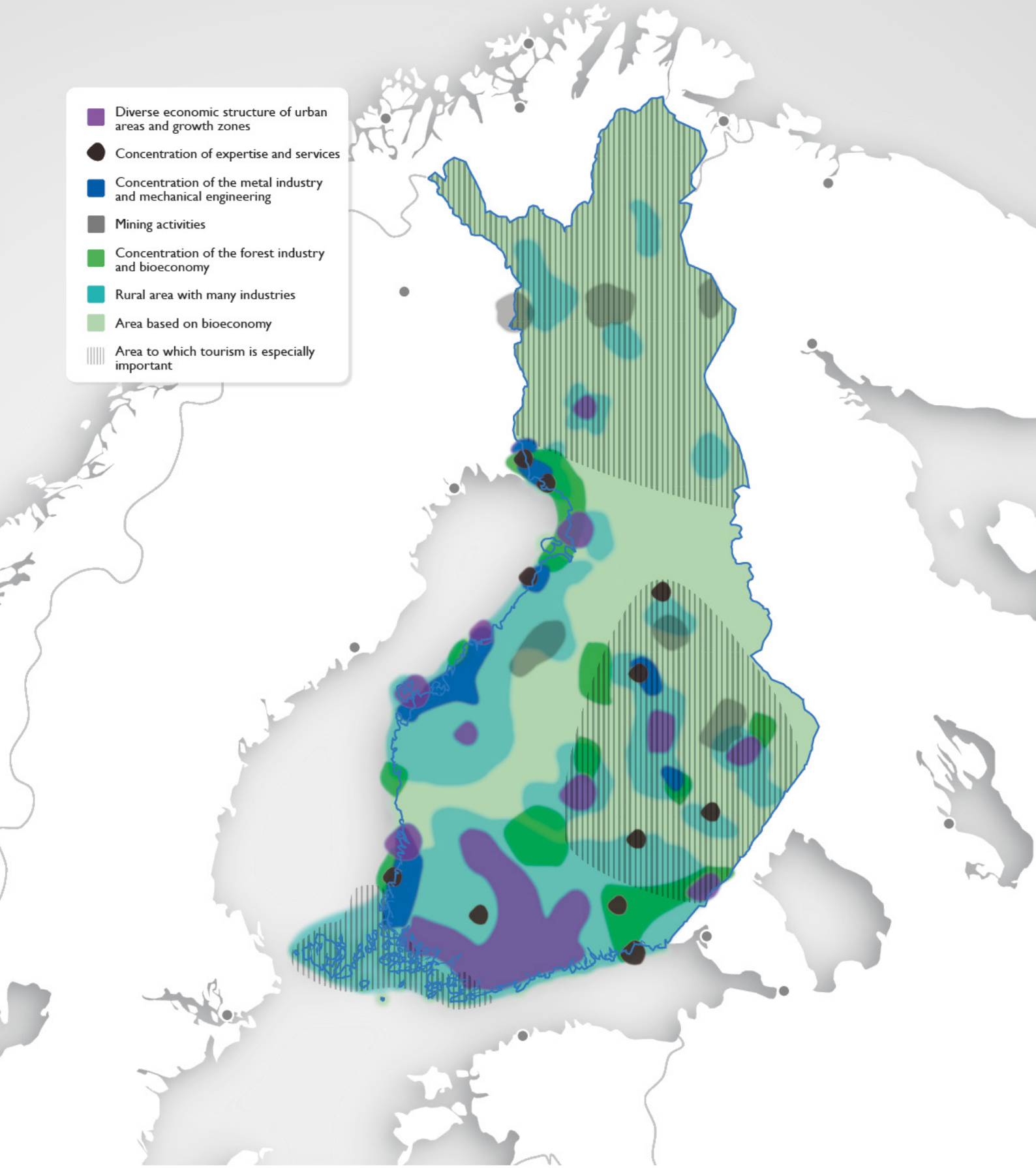


Figure 12: Industries that are in focus in regions in the regional structure of the future

Growing urban areas and their areas of influence have a diverse economic structure that combines the fields of services and production. Smaller urban centres appear as regional competence and service clusters in the regional structure. The concentrations of renewable forest industry and bioeconomy are largely created in areas with current concentrations of forest industry. The concentrations of metal working and mechanical engineering have also expanded in their current locations. Rural areas with diverse industries and local centres extend to the spaces between urban areas, complementing the regional structure.

The importance of natural resources and industries based on them will increase in the future. The growing use of renewable natural resources increases the demand on Finland's natural resources. For the natural resources economy to develop significantly, specialisation and advanced further processing are needed in addition to a networked regional structure, where specialised fields can benefit each other. Circular economy is promoted at both international and national level, which emphasises the importance of circular economy networks and nodes.

The bioeconomy and natural resources economy create new opportunities for renewing business activities, starting from acquiring raw material to transport and processing. For its part, bioeconomy also strengthens the development of the chemical industry. Design and product development create jobs in university cities in particular. A significant part of the bioeconomy is based on the utilisation of forest resources, which means that the aim must be the resource efficient use of Finland's extensive forest resources. The growth of bioeconomy increases the use of the lower road network, because timber procurement and agricultural transport are largely carried out on the lower road network. The current forest industry production areas are primarily developed as locations for the renewable forest industry, but other areas too have the prerequisites for business activity at the different stages of the bioeconomy production chains. Promoting energy production that is based on renewable energy sources and that occurs near the points of consumption increases the local and regional security of the energy supply and benefits the promotion of competitiveness and employment in different regions.

The extractive industry and related further processing, technology and research and development activities are an important growth field for the Finnish economy. Sustainable mining activities and related local processing activities have positive effects on the economy and employment in Eastern and Northern Finland in particular. The positive development of the extractive industry requires investment in domestic further processing, which promotes the development of the metal industry. The significant increase in mining transport is reflected in the amount of road and railway transport and the ports. Opening new mines also requires investments in the traffic and energy network.

The importance of domestic and international tourism in the service sector will increase in the future. Even though tourism is focused on the largest cities, nature-based tourism provides extensive development opportunities. Northern Finland, Finland's Lake District and the archipelago are the most important tourist attractions to be developed. Demand for nature tourism can be utilised especially in Northern Finland but also in Eastern Finland, where tourism centres play an important role as a part of the service network for sparsely populated areas. Functional and attractive service packages can be created by supporting the networking of tourism centres and areas and the development of zones for leisure time use.

Centres of different types as nodes in the networking regional structure

A polycentric and networking regional structure creates prerequisites for utilising the regional strengths and promotes the specialisation, division of labour and interaction of the regions. A regionally comprehensive network of centres of different sizes is the best guarantee of the population's well-being and the utilisation of regional resources in different parts of the country. As changes are constantly occurring in the position of centres and the relationships between them, it is important to ensure that the regional structure as a whole develops in a balanced way.

Every centre and region has its own special characteristics and strengths. The specialised regions that complement each other form a diverse whole, which can adapt to changes and renew itself. Good connections enable the creation of synergies between regions. Qualitative growth in particular is supported in regional development. Special expertise and networks are used to manage risks and find new opportunities even in problematic situations.

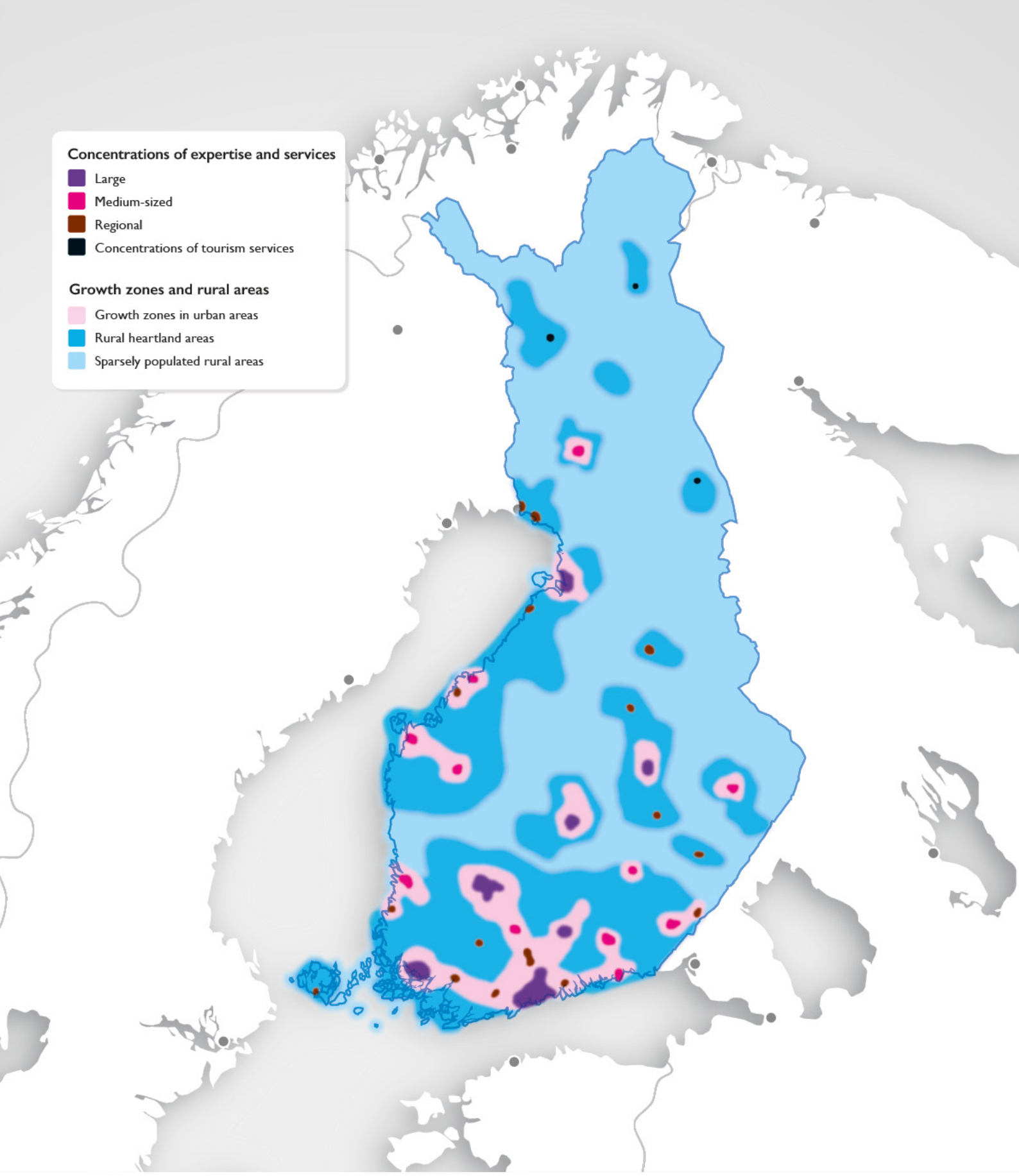


Figure 13. Finland's polycentric regional structure in 2050

Finland's regional structure is based on functional centres, a dynamic countryside and their multifaceted networking and interaction with each other. The growth of jobs and population is oriented to the large and medium-sized centres and their areas of influence. The Helsinki region develops as a strong European metropolis and connects to the other centres in southern Finland. The smaller urban centres function as diverse regional concentrations. Rural areas develop based on their strengths and interact with different kinds of areas.

The economic and business structure of the largest urban centres is diverse, and the areas act as drivers of development for their surrounding areas. These areas are Finland's most internationally important concentration of top-level expertise, and they attract both domestic and foreign experts and investments. Strong growth centres are needed in different parts of the country in order for the centres to bring spillover effects to as large an area as possible. The importance of efficient connections from the largest centres to locations both within the country and abroad is increasing. Cities and their areas of influence have a functional and consistent urban structure, and they provide attractive living environments. Appealing, functional and energetic urban environments are sources of employment and well-being and environments for new, innovative activity. The Helsinki Metropolitan Area is developing into a strong European metropolis and the location of several nationally and internationally important operations. It acts as the most important logistics centre in the whole country for international air and other connections, and it must be easily accessible from all parts of Finland.

Medium-sized cities are provincial and regional concentrations of expertise and services, and their development is also important for their expanding areas of influence. Many medium-sized centres have special expertise and industrial production of national and international importance. Promoting the position of medium-sized urban centres as a part of a polycentric network is important. In particular, the functionality of their knowledge base, the diversity of the business sector and connections to other areas should be ensured.

The smaller urban centres are mainly regional centres that provide services, offer places for study and act as centres of commuting in their regions. The strength of the centres is in the utilisation of the existing infrastructure, reasonably priced housing and often also good transport connections to larger centres. Smaller urban centres differ from each other, and they develop in different ways. There is a need to promote the renewal of business activity and the accessibility of services in these areas in particular. Some of the centres act in cooperation with a large centre nearby, in which case the cooperation and division of labour should be encouraged and strengthened.

Vitality for rural areas

The strengths of rural areas arise from their natural resources and the expertise and business activities related to their utilisation. The importance of service production as a rural employer is also increasing. Rural development is based on diversifying industries focused on the growing bioeconomy and the increasingly diverse production of food and foodstuffs. Alongside the traditional agriculture and forestry, new kinds of units specialised in distributed production arise. Local food production utilising regional strengths meets growing consumer demands. The self-sufficiency of rural small-scale industry and agriculture will improve when natural raw materials are utilised in recycling nutrients and producing local bioenergy. The opportunities provided by closed cycles, biorefineries and the side streams of domestic animal production as well as field biomass can be utilised in food production. It is important that a high level of self-sufficiency in food production is maintained. Practising agriculture and other related business activities in the vicinity of cities and other population centres will be an important opportunity for producing local food in the future.

Digital work and service production make the availability of services, gainful employment and entrepreneurship possible regardless of the location. The prerequisites for sustainable rural living close to nature are safeguarded by taking care of the nature, vitality and connections of the regions. Second home tourism arises as a resource in rural areas. Developing the existing tourism centres and areas strengthens and diversifies the service network both regionally as well as nationally. Local centres in rural areas form a comprehensive network of centres that acts as a framework for providing services. In the rural areas close to cities, the employment and service offerings of urban centres can be utilised.

Networking and zones to support polycentrism

The vitality, development opportunities and ability to renew of the whole country's regional structure are increasingly reliant on the interaction between centres and regions of different types; this interaction must be more diverse than before. There is a need to identify different kinds of cooperation areas and development zones and develop them from different starting points and for different needs. In particular, the interaction between large and medium-sized centres and their networking with each other and their surrounding areas will be highlighted in the future. Finland is sparsely populated by European standards, and therefore the division of labour between the centres here must be strengthened and they must be developed by supporting each other. Because the connections are more and more often international, support is needed to create new partnerships and effective ways to connect with global networks, too.

It is important for large and medium-sized centres to develop collaboration and the division of labour with the other centres and rural areas in their area of influence in a situation, in which the centres' area of influence continues to grow as the services in the central network grow thinner. This development must be steered so that urban areas with a harmonious urban structure and regions with attractive and functional environment and business sector emerge. To support large and medium-sized centres, there is a need to develop larger economic areas through the division of labour between the labour market and specialised services. This involves implementing polycentrism within urban areas and more extensively in their area of influence. It requires strengthening the network structure by developing the existing centres, logistics clusters and other nodes in the urban area and its area of influence, and connecting them together with growth corridors and good public transport connections.

The networking between large and medium-sized centres can be promoted with development zones that include good transport connections. They link centres with each other and promote and direct cooperation. By forming zones, it is possible to create functionally stronger market and cooperation areas and major regions, and eventually a network of zones that supports polycentrism throughout the whole country. The goal of the cooperation based on zones is to use the methods of comprehensive design to strengthen the operational preconditions of regions and their attractiveness regarding the placement of operations, more efficient use of traffic systems, or the production of local food and the development of tourism, for example. The zones that connect centres offer an extensive and diverse labour market area and a growing market for trade, services and housing. The opportunities for developing and offering increasingly specialised services also improve. Traffic services and transport connections create opportunities for companies to optimise their location as needed.

The opportunities for the functional diversity of zones vary in different parts of the country. The greatest ones are found in southern Finland, where the central network is relatively dense. The metropolitan area and its connections through the development zones to the other large cities in Southern Finland as well as Stockholm, Tallinn and St. Petersburg are among the most important focus points of the development of regional structure. The growth of the metropolitan area is rapid, and it can be strategically steered to rely on a polycentric network formed by larger and smaller urban centres.

Enabling ecosystem services as a part of a sustainable regional structure

The diverse services offered by nature are Finland's special strength. The ecosystem services offer production services and cultural services, as well as regulatory services that are important to the development of industries, the well-being of the population and environmental sustainability. The prerequisites for the services include ecosystems in good condition, the physical and functional connections of green and water areas as well as the preservation of natural biodiversity. In utilising ecosystem services, it is important to identify the challenges and opportunities presented by the special characteristics of each area.

In urban areas and their neighbouring areas, important issues, in addition to local food, are the regional green structure and opportunities for recreation, among other things. In the most important food production areas, key issues include the prerequisites for plant and animal production, the natural biodiversity and cleanness of agricultural environments as well as mitigating the load on water systems. In forested areas, the focus is on wood production and other natural resources as well as the preservation of natural values and their appeal from the perspective of leisure activities. In Northern Finland, reindeer herding also presents its own requirements for the use of nature areas. In mining areas, combining the different forms of land use is an important issue. Important issues in water and coastal areas include water quality, the utilisation of fish stocks, the protection of aquatic nature and leisure time use.

In the regional structure, it is important to safeguard entities significant to the Northern European nature. These include the green zone that follows the border between Finland and Russia, the connection of the forest, mire and fell areas in Northern Finland to the Swedish, Norwegian and Russian side of the border, as well as the Suomenselkä watershed area that provides a connection towards Eastern Finland for the forest and mire areas in Western Finland. The continuous agricultural areas in Southern and Western Finland create important zones of cultural nature. In Finland's Lake District, large, unbroken bodies of water form an important regional entity. The mire areas, which are unique with regard to biology and landscape, as well as the archipelago and coastal areas also hold a special position in Finland.

The increase in production in forests, fields and pastures as well as nutrient recycling make it possible to increase the use of biomass. Collecting the products of agriculture and forestry requires a well-functioning transport network, however. The increasing use of natural resources must also be combined with other functions. For their part, fields remaining in production use also support diversity. The increasing cooperation between the cultivation of cereals and animal husbandry promotes the recycling of nutrients. It is important to choose locations for new construction so that as little disturbance as possible is caused to the cohesion of nature areas and the functioning of ecosystems.

In addition to the natural environment, it is also important to recognise the built environment as a regional resource. New construction consumes a large amount of financial resources, natural resources and energy, meaning that the use of the existing building stock and infrastructure saves costs and the environment. The building stock is connected to many kinds of values and potential uses, and it is reasonable to utilise them not only for housing, but also in developing business activities in connection with different kinds of services and other business activity. The maintenance of built environment and ensuring the high quality of construction ensures the preservation and development of the foundation of regional structure.

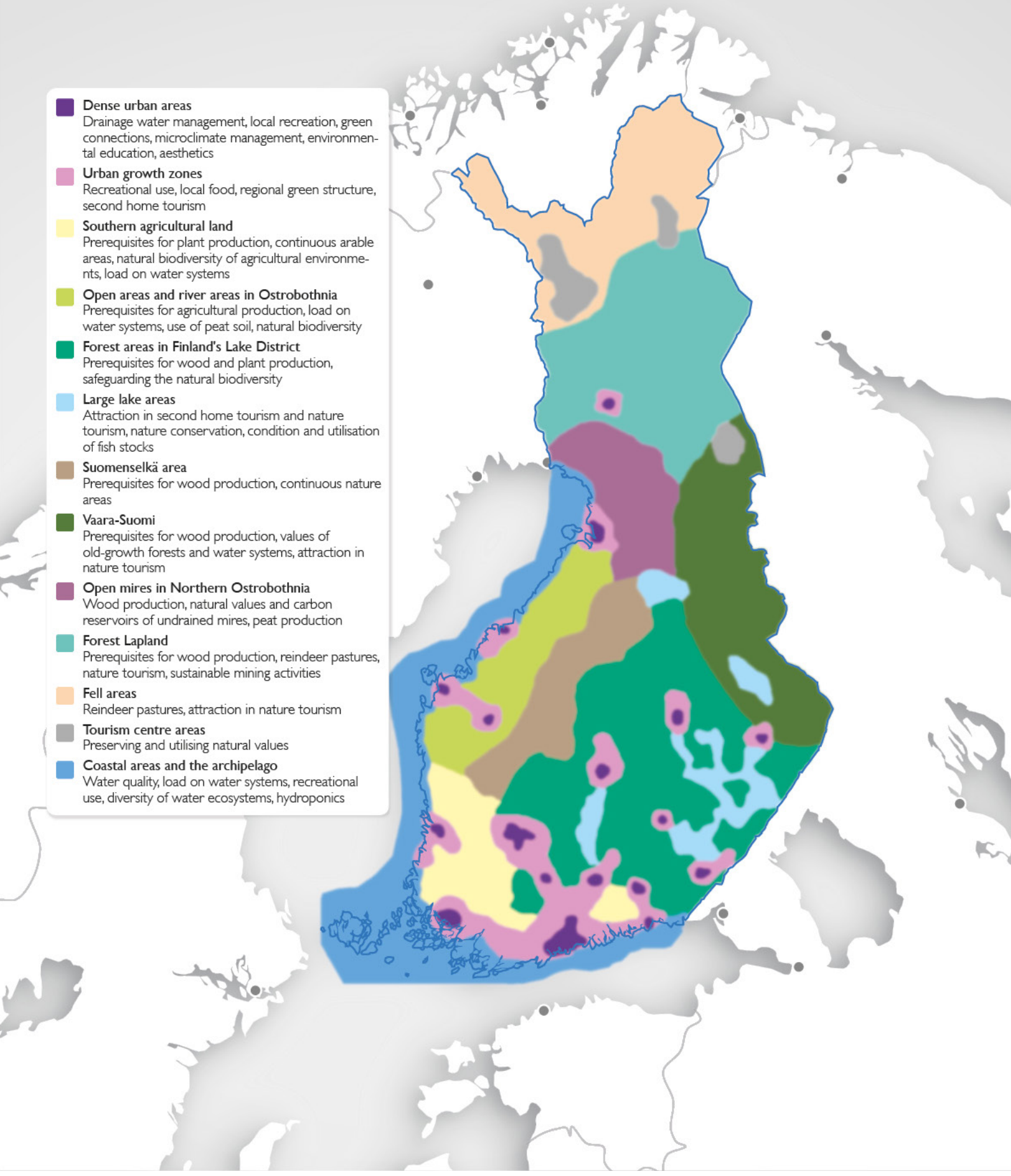


Figure 14. Points of view on the utilisation of ecosystem services and nature's special characteristics.

The versatile ecosystem services offered by nature are Finland's special strength. The special characteristics of nature in different parts of the country are very different from each other. In utilising the ecosystem services, it is important to recognise the special characteristics of each region and the opportunities they provide.

4.3

Developing traffic services and an enabling infrastructure

Traffic services enable more effective utilisation of the infrastructure

The focus point of developing the traffic system moves increasingly towards more efficient use of the existing infrastructure by developing services and technology. Transport routes are improved with cost-efficient measures, with the needs of traffic as a starting point. Cost-efficiency also supports the goal of energy and resource efficiency. Choices on the desired level of quality must also be made in maintaining the transport network based on the traffic needs.

In the future traffic system, the infrastructure, services and information will form a functioning whole together. Digitalisation offers possibilities for developing completely new demand-driven traffic services that change the traditional ways of planning movement, purchasing mobility services and owning means of transport. Preparations are made in developing the traffic system for the increasing popularity of automation and robotic vehicles, which opens up opportunities to utilise the channel capacity and improve the profitability of the field of traffic. In the future, traffic will be an important area of application of data-based services.

More efficient use of the traffic infrastructure and new kinds of traffic services also influence land use planning. Even though the space requirements for traffic areas will decrease thanks to a more efficient traffic system, preparations must be made for the requirements of advanced traffic services regarding the equipment level of routes, for example.

Vital traffic and transport services require innovativeness, demand and an ability to renew. The emergence of a networked, diverse field of businesses must be enabled in both passenger traffic and freight transport. Legislation and traffic system planning create the prerequisites for healthy competition in the transport market.

Importance of service level as a design tool increases

Service level-oriented traffic planning makes a functional, cost-efficient traffic system with a good service level possible without wasting resources. The authorities and local actors responsible for the traffic system cooperate in defining the desired service level. The service level must be based on the current and anticipated traffic demands. The physical infrastructure and the related services are scaled according to the desired service level. The aim is to reach the desired service level by using the most appropriate form of traffic for each link, so that environmentally friendly forms of transport are prioritised as far as possible.

Reliable infrastructure as a part of the regional structure

In addition to the traffic infrastructure, a reliable infrastructure covers both energy and data communications networks. Their reliability in disturbances caused by weather, road and water conditions or exceptional power outages must be ensured. In the traffic system disturbance management, it will be possible to use information systems and services more and more in the future.

The goal is a future with low carbon traffic. For this reason, it is important to take care of the infrastructure required by the use of fuels that replace oil, in addition to reducing mobility needs with the help of changes in the urban and regional structure and communications technology. In the future, the transport fuel distribution network will cover the distribution of electricity with charging points in addition to liquid hydrocarbon fuels, as well as a capacity for the national distribution of gaseous fuels, such as natural gas, biogas and hydrogen.

High quality data connections for the needs of the citizens and the business sector enable the growth of knowledge intensiveness in different fields and the service sector. The functionality and reliability of the developing data connections, such as fibre connections

and mobile networks, are prerequisites for the functionality of the traffic system. The intelligent traffic solutions and services largely operate through a network. In the future, the development of fast networks will be comparable to the traditional investments in routes. Data communications replace a part of the need for physical mobility. The aim is to develop reliable data connections of high quality throughout the country.

A robust transport system creates competitiveness

The transport system influences the operational preconditions and location of the business sector. On the other hand, economic activity and the vitality of regions enable the supply of competitive transport services. The concentrations of production and population are also concentrations of trade. A reliable infrastructure and high quality transport services that adapt to the changes in the economic structure are important for the competitiveness of the transport system.

Regional and specialised concentrations of expertise increase the possibilities for the emergence of networks of companies. They require functional, cost-efficient transport systems that gather thin streams of goods into more efficient wholes. This supports the development of logistics services as demand and needs grow. Studying transport systems as whole entities creates opportunities to combine transport, in which case the small and medium-sized enterprises' thin streams of goods can be managed cost-efficiently. The efficiency of the transport system improves as information and communications technology applications become more common in transport services. Despite the growth in the number of small companies, the greatest transport needs are generated in the individual production areas with transport intensive industries.

Preparing for changing transport needs

In the future, the focus point of consumer demand moving from material goods to services will reduce the need for physical transport. Global accessibility is also emphasised as the amount of globally services offered increases. Even if consumption becomes more directed towards services, the expansion of the market areas of e-commerce increases transport distances and the amount of small consignments that need to be transported rapidly. In recent years, e-commerce has started to grow rapidly, and the same development is occurring for organic and local food, for example. Even though these product groups represent relatively small transport volumes so far, the growth forecasts require the development of the related distribution system. Such product groups make the current transport streams thinner, and they often also involve home deliveries, which means that developing a cost and energy efficient distribution system is important in the future.

In developing the transport system, preparations are made for the growth and diversification of bioeconomy, which changes the export and the transport needs of the forest industry in particular. The higher processing degrees of products manufactured from natural resources affect the transport needs and change the nature of transport, when increasingly often the end product has a high degree of processing. The growth of bioeconomy increases the use of the lower road network, because timber procurement, agricultural transport and the transport of other raw materials largely occur over the lower road network.

In the coming decades, preparations must be made with consideration for the growth of extractive industry, so that the opportunities it presents can be utilised in a way that best supports the industrial structure. As far as possible, ore reserves should already be processed further in the mining areas and their neighbouring areas, and the aim should be to minimise the amount of raw material transport. A new mine and its production facility change the demand for transport and require an assessment of the traffic system service level and the need for new transport connections.

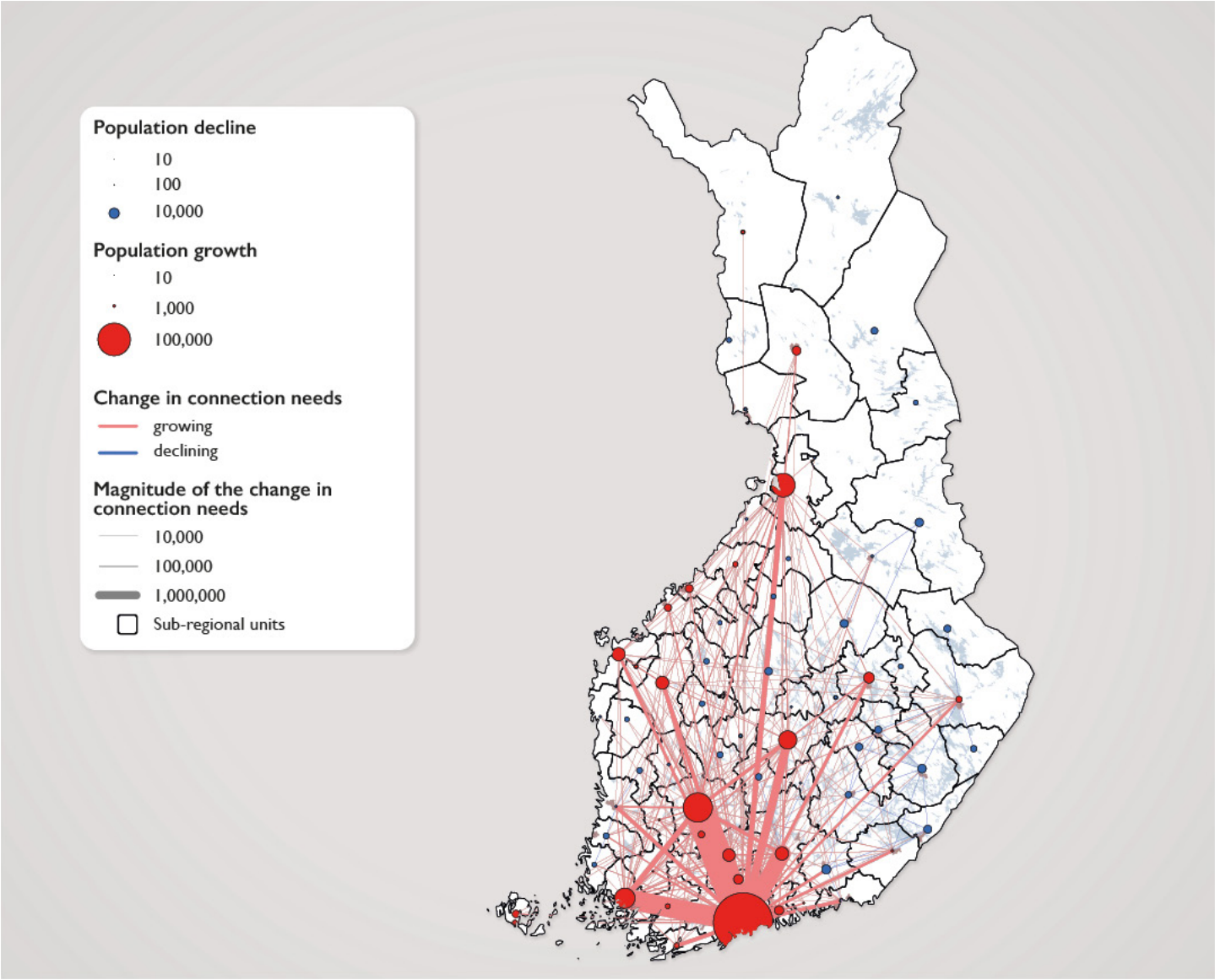


Figure 15. An outline of the future changes in the interaction between different sub-regional units based on the population projection for 2011–2040 of Statistics Finland.

The interaction between large cities increases as the population becomes concentrated in the growing urban areas. In addition to the described changes, the connections in the neighbouring areas, tourism and other industries as well as having multiple dwellings increase regional interaction. Large changes will occur in the interaction with centres in neighbouring countries, especially St. Petersburg and Tallinn. The proposed changes to the connection needs are calculated.

Accessibility while preserving the environment

Public transport services are designed to support each other particularly in urban areas as well as in the connections between larger urban areas, where the need for mobility is the greatest. The importance of the smooth flow of trip chains increases in the design of traffic services and the dialogue between modes of travel. Both long and short trips from door to door are affordable with regard to accessibility, price and the environment impact. Changing from one mode of transport to another is seamless and the level of service is high. To promote this, the aim is to move towards a unified national ticket and payment system as well as a schedule and information service. As urbanisation continues, digital solutions for traffic services are increasingly important.

The functionality of public transport and the smooth flow of traffic are emphasised in the design and development of the traffic system for the connections between the Helsinki Metropolitan Area and the other growth centres. Connections between growth centres are planned for a service level that matches the traffic needs. The aim is to ensure the desired service level using modes of transport that suit each link best.

The service level of railway traffic is improved on the busiest links between growth centres. Fast train connections reduce domestic air traffic needs and act as feeder connections to regional airports. Air connections operate on a demand-driven basis. There should be a connection of a few hours at maximum from different areas to an airport with a direct connection to Helsinki-Vantaa airport and the other central airports in the Nordic countries.

Rural traffic services will develop during the coming decades. The mobility needs of the ageing, increasingly sparse population are ensured with the help of communal mobility services or appropriate business models, the right kind of equipment and information technology. Passenger cars remain an important mode of travel on trips longer than walking or cycling distance as well as in feeder traffic. The need for passenger car traffic can be reduced even in sparsely populated areas with the placement of operations as well as data communications and innovative traffic services. The possibilities for using renewable fuels are also secured in sparsely populated areas.

In the pricing of car usage, a transfer from taxing the acquisition of vehicles to taxing their use enables pricing of the use of passenger cars so that car usage costs the most in areas that offer other options for travel. Reducing the taxation on acquisition would reduce emissions and energy consumption by lowering the average age of the vehicle population. This would also accelerate the increase in the use of renewable energy sources and smooth out the regional age differences within the vehicle population. The pricing of traffic that supports environmentally sustainable travel together with easily accessible, high quality traffic and passenger information enables the efficient use of the traffic system.

The importance of traffic within urban areas increases

The importance of traffic within urban areas increases as a result of their growth. The growth of the fringes of urban areas must be managed so that it does not lead to an increased need for traffic and dependency on passenger cars, and that the congestion of core areas and main routes does not endanger the vitality of the urban area. The community structure must be unified so that mobility needs decrease and the share of public transport, walking and bicycling of all travel increases. Habitation and operations that cause a lot of traffic must be primarily located next to public transport channels and in their vicinity. Complementary construction is used to support the operational preconditions of profitable public transport and urban mobility based on walking and bicycling. As a mode of feeder traffic, passenger car traffic supports public transport in the fringes of urban areas.

The increased leisure time mobility and the diversifying forms of working require that attention is paid in planning to the prerequisites for public transport, walking and bicycling in leisure travel and outside the commuting peak periods. Land use, housing, traffic and industry location planning are developed into a more seamless whole.

Due to the growth of bioeconomy, among other things, the importance of the interaction between urban core areas and their immediate vicinity will increase. This interaction must be made possible through joint traffic system and land use planning so that the urban structure does not break up.

Links to international traffic transport corridors

Parts of the Finnish transport network are included in the Europe-wide TEN-T network, which includes a core network and a comprehensive network. Technical requirements have been set for the routes and nodes included in these networks; they must be implemented by 2030 for the core network and by 2050 for the comprehensive network. Out of the nine European core network corridors in total, the North Sea-Baltic and Scandinavian-Mediterranean corridors reach Finland. The integration of modes of transport, functionality and the coordinated implementation of infrastructure at border crossing points in particular are emphasised in the implementation of the core network corridors. The Bothnian corridor is a part of the TEN-T core network. It goes around the Gulf of Bothnia and connects to the

routes to Central Europe via Sweden and the Baltic countries. The Baltic Sea motorway is also a part of the TEN-T core network, connecting the export ports of the Bay of Bothnia and the Gulf of Finland with the internal market areas of Europe.

The regional specialisation of production increases the needs focused on the transport corridors. The focus point of development should move away from the transport corridors and towards international development corridors, steering development in a zone-like manner and strengthening the regional structure. Development corridors relying on urban structure and transport corridors create opportunities for economic growth and balanced regional development. They also extend outside the country's borders towards St. Petersburg, Tallinn and Sweden.

Connections to ports and border crossing points as well as the connection to the international transport system are emphasised. In foreign trade transport, the seamless cooperation of modes of transport is important. Preparing for significant growth in the direction of St. Petersburg and Stockholm in particular and the increased importance of the Baltic direction as a transport route must be taken into account. The role of the direction of the Arctic Ocean and Northern Russia may change in the coming decades, if using the northern sea routes for Finnish export and import transports becomes possible. The need for new transport connections in the direction of the Arctic Ocean must be monitored and preparations for them must be made in planning, if necessary.

Finland's specialised ports are dependent on the import and export of specific fields. Changes in the ownership base of the ports and cooperation between them change the division of labour in the port network considerably. Competition between the Baltic Sea ports increases, because the port network is also dense in the other Baltic Sea countries. The growing use of natural gas and the expansion of zones of supply from Russian import to the gas resources in the Baltic Sea and the North Sea increase the need for investments in the gas distribution network and terminals, which for its part is also reflected in the division of labour in the port network. When implemented, uniform shipping route fees in the Baltic Sea will support Finland's competitiveness in the Russian transit traffic.

From the point of view of both passenger traffic and freight transport, the strengthening of networked development corridors that connect different regions is an important trend. The strongest of these include the Helsinki–Hämeenlinna–Tampere corridor continuing on to Tallinn, the Stockholm–Turku–Helsinki–St. Petersburg corridor in the east-west direction, and the Bothnian Arc. In addition to these development corridors that are linked with international transport corridors, it is also possible to identify other corridors based on strong transport connections and connection needs by 2050. The traffic system and land use of development corridors is planned in cooperation to enable well-functioning, competitive public transport.

The cross-border transport needs resulting from business activities as well as business and leisure travel increase in importance in passenger traffic. This is particularly emphasised in the connections to St. Petersburg and Tallinn, and in Eastern and Northern Finland. The vitality of the tourism sector in Eastern and Northern Finland also requires functional domestic trip chains as well as ones that cross borders.

Functional air traffic connections are important to international networking. A good level of international air connections is vital for the Finnish business sector and citizens' travel. Helsinki-Vantaa airport is developed as an internationally competitive node of air traffic between Asia and Europe, which serves both the business sector and leisure time travel needs. It is important to ensure in land use planning that the development opportunities of Helsinki-Vantaa are in accordance with the needs of international air traffic.

The metropolitan area offers the most direct connections abroad, but other large centres are also easily accessible globally. The traffic system enables the arrangement of direct connections abroad from areas with sufficient demand. The connections abroad are partly based on feeder traffic, so that there are fast land transport connections from different regions to the airport. The long distance train connections to Helsinki-Vantaa make a land transport feeder connection that is competitive with regard to travel time and traffic flow from the regional centres of Southern Finland.

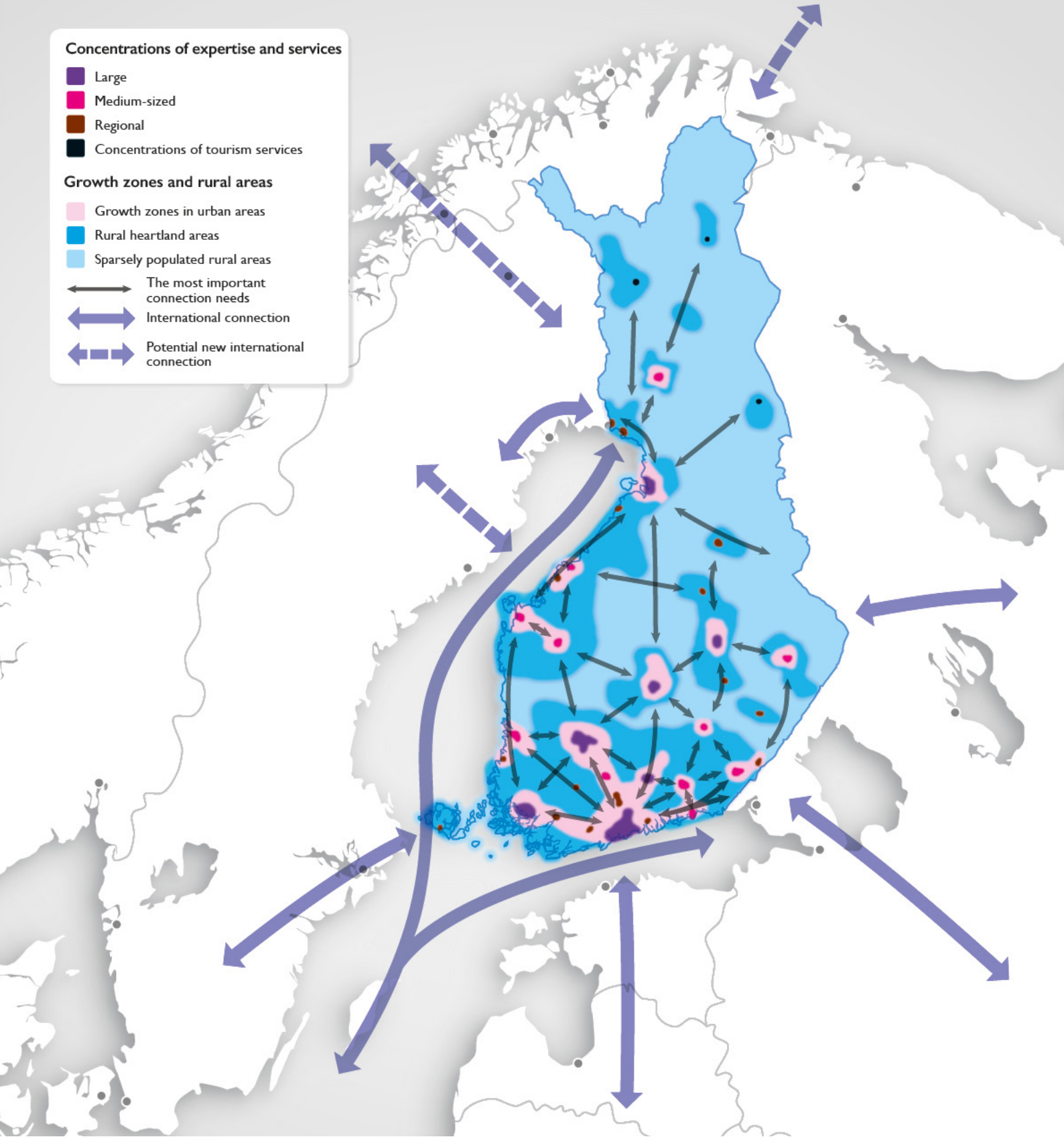


Figure 16. The most important connection needs in 2050

The importance of connections between the metropolitan area and the large urban areas as well as port connections will increase. The connections to St. Petersburg, Stockholm and the Baltic region become stronger as corridors of passenger traffic and freight transport, along with economic cooperation, commuting and the Helsinki–Tallinn twin city development. Tourism industries require high quality passenger traffic connections to Eastern and Northern Finland. The growth of bioeconomy and the extractive industry increases the transport needs of industry and also requires a functional lower road network. With e-commerce, thin consignment transport streams with high quality and punctuality requirements will increase. In Northern Finland, the needs for connections across borders will increase. Preparations must also made for connection needs in the direction of the Arctic Ocean in cooperation with the neighbouring countries.

5. From a development overview to implementation

Effectiveness by taking action in the same direction

The purpose of the development overview is to have an effect on the regional structure and traffic system offering good conditions for Finland's development as a competitive country with a sustainable environment that promotes the well-being of its inhabitants. The nature of the development overview is to outline the overall vision and the future direction. The purpose is to assist different actors in positioning and directing their activities in the whole set as the target formed by the regional structure and the traffic system.

The regional structure and traffic system and their effects are a result of the complex activities by the different administrative sectors of the government as well as the regions and municipalities. The complexity of the actors and activities is a challenge to the national development of the regional structure and traffic system. More impact is gained when the actors are aware of the significance of the regional structure and traffic system from the point of view of their own activities and are able to use the development overview as background material in preparing decisions with an effect on the regional structure and traffic system.

The regional structure involves the placement of different operations. The traffic and data connections, competence structures or the placement of services and production plants in particular are examples of key elements of regional structure that are affected nationally by the different sector policies of the state. The effects are formed from policy definitions into concrete actions that guide the placement. Many actions with an impact on the regional structure and traffic system are indirect. For example, administrative structures, current transfer mechanisms and other economic forms of steering can influence the development of the regional structure and traffic system significantly. For the administrative sectors to be able to promote the development overview, they must be familiar with their activities with an impact on the regional structure and the impacts themselves. The assessment of impacts related to the regional structure and traffic system should be developed and used more.

The use of regions and its planning influence the development of the regional structure and traffic system more directly and comprehensively. Land use planning combines different demands over a long period of time and ensures the formation of a suitable and sustainable regional structure. Correspondingly, regional development influences the functional regional structure. It is important that the physical and functional regional structure and the national policy definitions and actions relevant to them support and complement each other and steer the development in a sustainable direction.

The regional councils are very important in developing the regional structure and traffic system in their regions, because they are responsible for the regional land use planning and the development of regions as well as the coordination of the traffic system planning. This gives the regional plan and strategy a key role, because it presents the desired development of the region comprehensively over a long period of time, combining different factors. The cooperation between regions over administrative borders is increasingly highlighted in the development of the regional structure and traffic system, such as within the framework of different development zones or major regions. In addition to the regional councils, The Centres for Economic Development, Transport and the Environment also play an important role as the regional structure and traffic system's implementers, experts and partners in cooperation.

Changes in the operating environment must be monitored

The development overview is based on forecasting the future and identifying the most important factors of change, as well as reviewing the options and points of view derived from

them and the current regional structure and determining the direction. The development overview cannot be interpreted as a goal-oriented vision of the future separate from megatrends and boundary conditions; instead, it includes many development directions bound to them.

The uncertainty related to forecasts must be taken into account in implementing the development overview. The further into the future the forecast reaches, the more uncertainty it includes. The regional structure and traffic system change slowly, while the operating environment changes faster. The development overview and the guidelines it proposes emphasise resilience, or the ability of the regional structure and traffic system to be flexible and adapt to different kinds of changes.

When implementing the development overview, it is necessary to monitor the changes in the operating environment and prepare for unexpected developments and potential risks. Urbanisation and centralisation may continue at a faster rate than described, if the development of the economic structure does not create new jobs and the educational structure will not guarantee knowledge capital in medium-sized urban areas. The increasingly scarce public finance resources may change the service structure more than anticipated and this may also be reflected in the possibilities for maintaining the infrastructure. Energy availability may also decline and the goals of replacing fossil fuels with renewable sources of energy may be reached slower than anticipated.

Many factors that are still difficult to anticipate are connected to climate change and emissions reduction targets in particular. A potential influx of climate refugees and the changing needs of food production may also be reflected in Northern Europe. There are also large uncertainty factors related to the development of global economy and thereby also the economic development of the EU; its deterioration is inevitably reflected in the development of Finnish economy. The development of neighbouring areas, Russia in particular, is very difficult to anticipate. The development overview of the regional structure and traffic system attempts to prepare for very different kinds of developments in Russia, ranging from visa-free travel and a common labour market to a reduction in the Russian connections and transit traffic. Uncertainty factors are also linked to the development of the Barents area and how large a role Finland will play as an actor in the northern region. The opening of the northern sea routes and their true competitiveness in the Asian and American transports are also still uncertain and dependent on Russian development.

The development overview outlines a sustainable direction for the regional structure and traffic system, where the set goals of competitiveness, well-being and sustainable environment can be realised as well as possible. However, the development overview is general in nature, so that the policy definitions derived from the goals include uncertainty and risk factors and mutually conflicting goals, which will emerge when implementing the development overview. It is good to identify potential conflicts and strive to make choices and find solutions, through which the conflicts can be removed or mitigated. For example, mining activities require actions to safeguard the environmental sustainability and combine it with other industries and regional demands. The development overview most be seen as a whole, and the impact of the actions must be assessed compared to the goals set.

APPENDIX:

Development overview preparation process

Organising the preparation:

The development overview was prepared by a working group appointed by the Ministry of the Environment in May 2013. The following representatives from ministries, regional councils, the Finnish Transport Agency and the Centres for Economic Development, Transport and the Environment (The Centres for Economic Development, Transport and the Environment) have been included in the working group:

Director of Spatial Planning *Ulla Koski,* Ministry of the Environment, Chair

Environment Counsellor *Timo Turunen,* Ministry of the Environment, Deputy Chair

Senior Engineer *Petteri Katajisto,* Ministry of the Environment

Senior Adviser *Pia Karjalainen,* Ministry of Transport and Communications

Senior Adviser *Anni Rimpiläinen,* Ministry of Transport and Communications

Senior Officer, Rural Affairs, *Hanna-Mari Kuhmonen,* Ministry of Employment and the Economy

Ministerial Adviser *Ilkka Mella,* Ministry of Employment and the Economy

Ministerial Adviser *Johanna Niemivuo-Lahti,* Ministry of Agriculture and Forestry

Senior Architect *Raija Seppänen,* Ministry of Agriculture and Forestry, deputy member

Region Mayor *Jussi Huttunen,* Regional Council of North Savo

Planning Director *Jussi Rämet,* Council of Oulu Region, deputy member

Executive Director *Anita Mikkonen,* Regional Council of Central Finland

Planning Director *Ari Pietarinen,* Regional Council of Kymenlaakso, deputy member

Director*Anne Herneoja,* the Finnish Transport Agency, permanent expert

Land Use Manager *Harri Kuivalainen,* Centre for Economic Development, Transport and the Environment for Southeast Finland, permanent expert

A group of researchers including experts from the Verne Transport Research Centre and the EDGE Laboratory for Architectural and Urban Research of Tampere University of Technology, the Finnish Environment Institute, the Karelian Institute of the University of Eastern Finland and the Finland Futures Research Centre of the University of Turku have acted as experts in the preparation of the development overview.

Key phases of the preparation

The preparation of the development overview progressed in stages, starting from forecasting the future and moving on through a review of the options and points of view to defining the guidelines for the regional structure and traffic system and their regional concretisation. During the preparations, several events were arranged for interest groups; some of these were regional forums, or regional presentation and workshop events in different parts of Finland.

Foundation stage

- As a starting point for the preparation of the development overview, the current status of the regional structure and traffic system, its development and the existing policy definitions were studied and analysed and the ALLI Atlas that encapsulates the reviews was drawn up.

- In the start-up forum organised for the interest groups and the resulting ota.kantaa.fi-discussion, the views of the interest groups on the starting points and drawing up of the development overview were mapped.
- The ministerial working group on public administration and regional development handled and instructed the development overview preparations.

Preparation progress

- The key changes in the operating environment were identified and alternative developments for the regional structure were drawn up.
- The future development of the regional structure and its opportunities and threats were assessed from the point of view of centralisation and polycentrism, so that strength-oriented developments of the metropolitan areas, growth centres and regions were in view.
- The results of the working stage and the related regional forums and interest group surveys were reported in the publication 'Ennakointiteemojen ja tulevaisuuskuvien alueelliset näkökulmat' on the regional views of anticipatory themes and visions of the future.
- Three goal-oriented points of view for forming a development overview were drawn up based on the development overview. The Finland of technologies, natural resources and services was presented. These were mutually complementary points of view that highlighted future opportunities, and they were concretised at the level of the regional structure and traffic system. The development overview was outlined as a combination of these points of view, emphasising the strengths of the regions as well as the goals set for the development overview and how to reach them.
- The results of the working stage and the related regional forums and interest group surveys were reported in the publication 'Suomen aluerakenteen ja liikennejärjestelmän kehityskuvanäkökulmat' on the development overview's points of view on the Finnish regional structure and traffic system.

Finishing the development overview

- The draft development overview was completed at the end of 2014, after which a comment round was arranged for central interest groups.
- Experts from the ministries finished the development overview, taking the feedback from the interest groups into account.
- The essential content of the development overview was presented to the ministerial working group on public administration and regional development, which discussed the issue and marked it as for information.

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In the conditions of internationalisation and increasing competition, as well as for the sake of environmental sustainability, it is important that the development of Finland's regional structure and traffic system is based on an overall vision. In this way, Finland's development into a competitive, prosperous, low-carbon country can be promoted.

The development overview is used to form a national vision of the regional structure set as the target and the traffic system that supports it until 2050. The foundation pillars of the regional structure and traffic system set as the target include strengthening Finland's international position, a polycentric regional structure as well as developing traffic services and an enabling infrastructure. In the development overview, the regional structure and traffic system have been defined by taking advantage of the special characteristics of the different parts of the country as well as the regional strengths and the division of labour between regions.

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